



# American Society of Pharmacognosy

Summer 2020

Discovering  
Nature's  
Molecular  
Potential

ASP Newsletter: Summer 2020, Volume 56, Issue 2

## In Memoriam: Mansukh C. Wani



Dr. Mansukh C. Wani

By Nicholas Oberlies, PhD

It is with a heavy heart that I report on the passing of Dr. Mansukh C. Wani on April 11, 2020 at the age of 95. To the natural products community, he is most well known as the co-discoverer of taxol, which was first isolated from the bark of the Pacific yew tree, *Taxus brevifolia*.<sup>1</sup> If that singular achievement were not enough, he and his colleague of nearly 40 years, the late Dr. Monroe Wall, also co-discovered camptothecin from the Chinese tree *Camptotheca acuminata*.<sup>2</sup> That discovery led to two cancer drugs, topotecan and irinotecan, in the 1990s, which are analogues that circumvent the solubility problems of the isolated natural prod-

uct. It is extremely challenging to place formal metrics on either of those discoveries. They led to multi-billion-dollar drugs. They have been used in the treatments of millions of cancer patients. Those original publications have spawned thousands of research projects. They are evidence on the value of nature to help mitigate human disease. In fact, if the cancer arena were not large enough, taxol is even used to coat stents, mitigating heart disease by preventing restenosis in arteries.<sup>3</sup>

When the news started circulating of Dr. Wani's death, many people commented on what a hero he was to several generations of scientists. The work of Wall and Wani is often characterized as a dynamic duo, as it is so rare to discover one compound from nature that becomes a drug, discovering two seems nearly superhuman. I had the distinct honor of working with Dr. Wani for over two decades, often traveling with him to

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## ASP Diversity and Inclusion Committee Call to Action

The goal of the ASP Diversity and Inclusion Committee is to foster a diverse, inclusive, and equitable community within the ASP. We, the members of this committee, explicitly state that **BLACK LIVES MATTER**. To our Black students, colleagues, and friends, we see you, we support you, we value you, and we commit to doing better to make the ASP a more equitable environment. As pledged in the ASP's recent statement in support of the Black Lives Matter movement, the Diversity Committee is providing concrete actions and



resources to address structural racism within our organization. We ask all members to join us in taking action to support people of color in our professional and personal communities. This work will not be easy, and it will not be comfortable. It will take more than an afternoon webinar or a single conversation to deconstruct advantages that have been engineered over the decades. At this crucial moment in time, we must be intentional with both our words and actions. Our impact as individuals and as a society can be powerful.

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Dr. Mansukh C. Wani



ASP Diversity



Dr. Arnold Lester Demain

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## American Society of Pharmacognosy **Editor's Corner**

By Edward J. Kennelly, PhD

It seems like a lifetime ago when we started to plan for the Summer 2020 *ASP Newsletter*. So much has happened in the past few

months, including a pandemic that has killed more than 500,000 people worldwide, with about 20% of those occurring in the United States. One of consequences of the COVID-19 pandemic was the cancellation of ICNPR 2020 that was to be held in San Francisco in late July. Dr. Roy Okuda, local organizing committee chair, has written a summary of the years of planning that went into what was hoped to be the largest-ever natural product chemistry conference; it is now distinguished as the first-ever ASP meeting to be canceled. In the midst of this cancellation, the ASP Social Media Committee, chaired by Dr. Sandra Loesgen, stepped up to offer the first-ever ASP webinar series that has been a great success.

Longtime distinguished ASP member and fellow, Dr. Mansukh Wani, passed away at the age of 95. Famous as the co-discoverer of two clinically important natural product-based cancer drugs, his discoveries have impacted science and millions of patients who have been treated with taxol and camptothecin analogs. ASP Vice President Dr. Nick Oberlies, who worked with Drs. Wani and Monroe Wall at Research Triangle Institute, has written a beautiful tribute, and I hope you will take time to reflect on Wani's life-changing accomplishments.

The killing of George Floyd by the Minneapolis police in June led to reactions far and wide, including ASP and our flagship publication, the *Journal of Natural Products*. *ASP Newsletter* was almost ready to go to press when I received a thought-provoking e-mail from Professor Brian Murphy (who wrote a cover article on diversity in the Winter 2018 *ASP Newsletter*, [www.pharmacognosy.us/wp-content/uploads/ASP\\_NL\\_53-4.pdf](http://www.pharmacognosy.us/wp-content/uploads/ASP_NL_53-4.pdf)) copied to the Diversity and Inclusion Committee asking me if there was anything that the *ASP Newsletter* could do to in response to the killing and the national awakening that was occurring. Within days the ASP Executive Committee issued a strongly worded statement condemning racism that is reprinted in this issue. I also began to reach out to Black ASP members who I knew to ask for reaction to the statement, and if they had any interest in writing an article. I was not faring well, until I got an unexpected e-mail from Professor Lesley-Ann Giddings and a follow-up phone

call. Coordination with her and the Diversity and Inclusion Committee resulted in the second lead article in the Summer *ASP Newsletter*. I appreciate the committee's hard work, as well as the commitment of the ASP Executive Committee, especially Dr. Barry O'Keefe, for providing information and context to the *Newsletter* on this important issue.

I am committed as *ASP Newsletter* editor to work closely with the ASP Executive Committee and the Diversity and Inclusion Committee to cover issues of systemic racism. I am sure some of these issues will be difficult and uncomfortable for the society to confront, but they are important to discuss in an open format like the *Newsletter*. I also want to acknowledge Dr. Lenny McDonald, a long-time ASP member and former ASP Executive Committee member, who helped me edit the articles dealing with racial issues in this *Newsletter*. *Journal of Natural Products'* new editor-in-chief, Dr. Phil Proteau, coauthored an editorial that was run in all 61 American Chemical Society journals about racism in chemistry journals. I appreciate Editor Proteau's patient and quick responses to my many questions about this issue, and I am sure dealing with me was not what he thought he would be doing when he took on editorship this past January.

I was sorry to learn that Ms. Devhra BennettJones, our long-time *ASP Newsletter* contributor and member of the *ASP Newsletter* Advisory Board, has left the Lloyd Library. I want to thank her for her wonderfully informative and detailed "From the Archives" columns that delved into different aspects of ASP history and pharmacognosy. When I would discuss possible column themes with Devhra, she impressed me with how open she was to different ideas; she would take a small seed of an idea and make it grow into a well-researched and interesting column. Thanks, Devhra, for all that you have done for the *ASP Newsletter*, and good luck.

Finally, you likely have noticed that the overall design of the *ASP Newsletter* is completely different this issue. *ASP* now has a new logo, and we acknowledge the work of the students of the New York School of Visual Arts, the design firm of Chermayeff & Geismar & Haviv, as well as members of the ASP ad hoc logo committee. The winner of the logo contest was Ms. Xuehua Cai, who received \$1,000, and who will be remembered in ASP history as the designer of our third official logo. Ms. Nancy Novick, who is the *ASP Newsletter* Design & Production person, has been hard at work incorporating the new logo and branding into the redesign of this publication. I hope this fresh look makes the *Newsletter* more visually appealing and contemporary. ■

## In Memoriam: Mansukh C. Wani

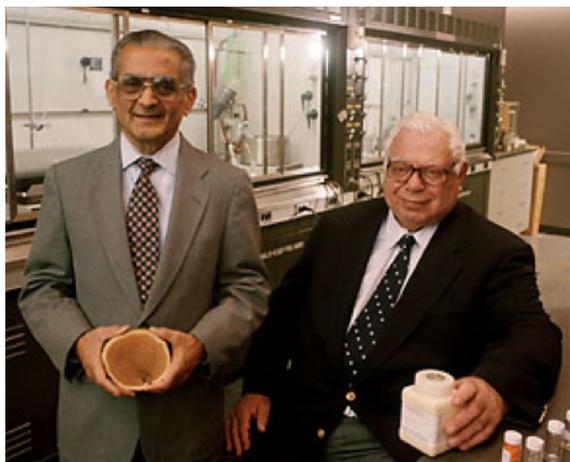
**If that singular achievement were not enough, he and his colleague of nearly 40 years, the late Dr. Monroe Wall, also co-discovered camptothecin from the Chinese tree *Camptotheca acuminata*.**

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meetings and conferences. While he was always proud of those discoveries, he was also extremely humble. He loved to talk about the trials and tribulations associated with the research that, ultimately, led to those compounds being advanced into drugs. Yet, he was quick to point out the numerous players along the way, from botanists, to bench scientists, to pharmacologists, to leading oncologists, all of whom also had critical parts to play.

There are many aspects of Dr. Wani's life that epitomize the proverbial American Dream. He came to the United States in the late 1950s to pursue his PhD at Indiana University. He spent weeks traveling to the US by boat, train, and then bus, all the way to Bloomington, IN, leaving behind his wife Ramila and young son, Bankim. He was an older student, over 30 at the time, having already worked in India as a lecturer in chemistry. He told me that more than one person tried to dissuade him from coming to the USA, as he had a promising career and young family in India. Yet, he was drawn to the pursuit of knowledge, something that was evident up until his death, as he still kept an office, traveling there by Uber when he could no longer drive just so he could read up on the literature and correspondence.

He completed his PhD in about 2.5 years, saving enough money to bring his family here before



One of Dr. Wani's favorite photos, with his long time colleague Dr. Wall. He is holding a sample of *Taxus brevifolia*.

COURTESY RESEARCH TRIANGLE INSTITUTE



moving to the University of Wisconsin for a short postdoctoral stay. Then, he learned of a position at the newly formed Research Triangle Institute (RTI), joining there in September of 1962. It is probably worth noting that the Research Triangle was just conceived a few years earlier, and it was not the hub of biotechnology that it is today; it was just some land and a few prominent scientists starting to work on interesting ideas. He started a long and successful career there, and even though he retired after 44 years in 2006, he never gave up his passion for science.

The chemistry efforts at RTI were led by Dr. Wall, who passed in 2002, although Dr. Wani did not work with him directly at first. Sometime after working there for about two years, Dr. Wall developed a notion that Dr. Wani had almost "magic" hands when it came to generating a crystal suitable for X-ray crystallography (and even when I joined their team in 1998, Dr. Wall still held that belief). Dr. Wani was first moved to a project to help develop a crystal for their work on camptothecin, which he achieved in about six months, leading to their first seminal paper.<sup>2</sup> From that point forward, he always worked with Dr. Wall, both on the isolation and struc-

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Dr. Wani standing in front of the National Historic Chemical Landmark from the American Chemical Society.

PHOTO: GEOFF CORDELL

**The work of Wall and Wani is often characterized as a dynamic duo, as it is so rare to discover one compound from nature that becomes a drug, discovering two seems nearly superhuman.**

## In Memoriam: Mansukh C. Wani

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ture elucidation of natural products as well as the development of analogues thereof, mostly to improve solubility and potency. In fact, even at the time of Dr. Wall's death, they were still working on camptothecin analogues, having developed over 20 patents in that regard over the years.

As I sit here and try to recollect the story, I am sad that Dr. Wani is not around to tell it first hand. Because, if you ever wanted to hear about drug discovery and how important it is to "stick with it," then all you had to do was ask him about taxol. He loved to tell that story, whether it was to students, scientific lecture halls, or the person sitting next to him on an airplane. Briefly, the structural work on taxol took much longer than camptothecin, and on more than one occasion, Dr. Wall told him to stop work on that project, as they had many other priorities (including ongoing studies on camptothecin, which was in the clinic at that time). Thankfully, Dr. Wani did not exactly abide, instead getting permission to do the work on a low priority basis, which, he would smile and say, meant "working on evenings and weekends."

Even when he had determined (what he believed was) the structure of taxol, Dr. Wani initiated some medicinal chemistry on it, effectively trying to enhance its potency. In doing so, the reactions were not working as planned, and that flummoxed him for several weeks, until finally he realized that his initial structural hypothesis was wrong. If it were not for those extra experiments, he would say somewhat forebodingly, Wall and Wani would not be famous for the structure of taxol but



Dr. Wani, with Dr. Susan Horwitz and Dr. Robert Holton, at the commemoration ceremony for the National Historic Chemical Landmark.

PHOTO: NICK OBERLIES

rather would be infamous, or perhaps even a footnote, for having published it incorrectly. Indeed, Dr. Wani once confided in me that he breathed a great sigh of relief when the total synthesis of taxol was reported in early 1994,<sup>4,6</sup> independently confirming that the structure was correct. Even-

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## We have lost a pioneer, a scientist, a mentor, and an inspiration.



Dr. Wani at the landmark in La Wis Wis campground in the State of Washington. The landmark commemorates the original collection of *Taxus brevifolia* in 1962 by a team of botanists lead by Dr. Arthur Barclay.

PHOTO: NICK OBERLIES

## In Memoriam: Mansukh C. Wani



Dr. Wani standing next to a specimen of *Taxus brevifolia*. This was taken in 2002 and was the first time he had seen a live wild specimen of this species he had worked on for decades. I recall that he had reverence for it.

PHOTO: NICK OBERLIES

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tually, just under 50 years ago, the structure of taxol was reported, correctly.<sup>1</sup>

The story really only starts there, and again Dr. Wani, in his humble way, would emphatically point out the critical pharmacology performed by Dr. Susan Horwitz to determine the mode of action,<sup>7,8</sup> followed by the development efforts of the National Cancer Institute<sup>9</sup> followed by the circumvention of supply issue problems by Dr. Robert Holton, etc. In fact, the abbreviation “etc.” does not do it justice as there were thousands of people involved, leading to approval to treat first ovarian and then breast cancer. ASP Fellow Horwitz has written a wonderful reflection on her “life,” as it were, with taxol,<sup>10</sup> which paints some of the historical context and, at least to me, serves as an inspiration. It has been said that clinicians that are old enough to remember can point to the days before taxol versus after taxol, as it had that large of an impact on cancer chemotherapy.

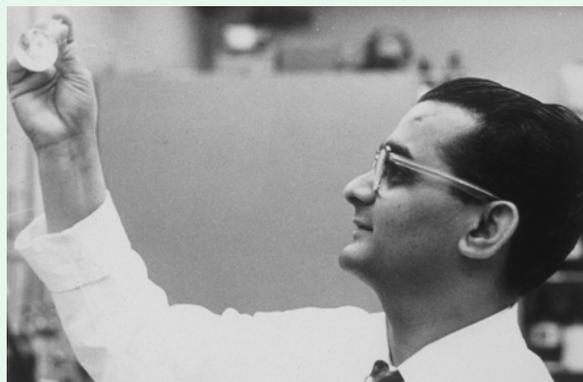
We have lost a pioneer, a scientist, a mentor, and an inspiration. His family lost a husband to Ramila, a father to Bankim and daughter-in-law Darshana, and a grandfather to Nilesh. We all lost a friend, and even if you had the good fortune to meet him only once, you would feel that sort of kinship. Below I have collected quotes from some of the many people who knew Dr. Wani. ■

Young Dr. Wani working in the lab; he wore a tie to work everyday.

PHOTO: RESEARCH TRIANGLE INSTITUTE

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# Celebrating Mansukh C. Wani



Considering his stunning accomplishments, Mansukh was an extraordinarily modest man, always interested in the accomplishments of others, particularly young colleagues. He would often call to ask what new experiments I was doing with taxol and was thrilled when I would report how many millions of cancer patients had been given the drug.

—Susan B. Horwitz, PhD  
ASP Fellow



It was one of the great honors of my life to meet both Drs. Wani and Wall. When I first interviewed with Norman Farnsworth to study pharmacognosy in 1987, he expressed his concern that pharmacognosy was no longer popular for American students. (Okay, he put it differently but this is a family newsletter.) Drs. Wani and Wall changed that and rejuvenated the field. After taxol and camptothecin analogs were approved, it became important again to study natural products. Their work was also singularly important in justifying the NCI's investment in natural products and the Natural Products Branch. Over the years, I was lucky to spend more time with Mansukh and get the opportunity to thank him personally. He was a great pharmacognosist and a gentle soul. All of us, in some way, owe this great man a debt of gratitude.

—Barry R. O'Keefe, PhD  
ASP President

**He was a great pharmacognosist and a gentle soul. All of us, in some way, owe this great man a debt of gratitude.**



Drs. Monroe Wall and Mansukh Wani were highly regarded by the NCI as key contributors to the anticancer drug discovery program for nearly four decades. Their seminal discoveries of taxol and camptothecin rank among the most significant contributions to the development of efficacious drugs for the treatment of a wide range of cancers; and the unique mechanisms of action spurred the development of many novel entities, both naturally-inspired and synthetic, as potential drug leads that interact either with tubulin or with topoisomerase I.<sup>1</sup> Both Drs. Wall and Wani were recognized with special awards from the NCI in 1996, and, in fact, taxol was heralded as the flagship of the NCI program for many years following its approval for clinical use in 1992. I will always treasure my association with Dr. Wani as a great friend and colleague for over 30 years. He was an inspiration to all who met him!

—Gordon Cragg, PhD  
ASP Fellow and Honorary Member

<sup>1</sup> Cragg, G. M. and Newman, D. J. A Tale of two tumor targets: Topoisomerase I and tubulin. The Wall and Wani contribution to cancer chemotherapy. *J. Nat. Prod.* **2004**. 67, 232-244.



We were privileged to collaborate with Dr. Wani for over 30 years on both a National Cooperative Drug Discovery Groups (NCDDG) project followed by a program project (P01), both directed towards the discovery of new anticancer agents of natural origin. Research Triangle Institute was a key component of the group, and, after the unfortunate passing of Dr. Monroe Wall in 2002, Mansukh took on a leadership role. A key feature of these projects has been the face-to-face group meetings, and one particularly memorable gathering of this type that Mansukh attended was held in Santo Domingo, Dominican Republic, for which the visit was extended so we could all go on a field trip and examine the local flora. As the years went by, Mansukh continued to have a very great interest in the technical progress being made in the project,

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## Celebrating Mansukh C. Wani

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even after he and his wife moved into a retirement home. He was a very great inspiration to us all and always found time to inspire younger investigators. He will be very greatly missed.

—A. Douglas Kinghorn, PhD  
ASP Fellow and Honorary Member



Mansukh Wani was a lovely man. He was a highly accomplished scientist with an outstanding track record of natural product drug discovery, while also being humble and friendly in all his interactions with fellow scientists, especially with younger scientists. As a fellow taxol enthusiast I had several fascinating conversations with him on the discovery of taxol, including his account of how he worked on it on a “low priority” basis as described by Dr. Oberlies. One additional detail is that, try as he could (and he tried very hard), he could not get crystals of taxol suitable for x-ray crystallography, and the NMR spectrometers in the late 1960s were unable to give enough data for the solution of a complex structure like taxol. The crucial breakthrough came when Mansukh tried the Zemplen transesterification reaction conditions on taxol. Overnight treatment with sodium methoxide in methanol gave the methyl ester of the side-chain and a larger fragment. Preparation of heavy atom derivatives of both fragments then led to successful X-ray structure elucidation by Andrew McPhail and his associate P. Coggon at Duke University and showed that the larger fragment was a compound previously isolated by T. G. Halsall at Oxford as baccatin III. This key finding then led to the correct structure of taxol. In my opinion taxol might never have been discovered without Mansukh’s perseverance and “magic hands.”

—David G. I. Kingston, PhD  
ASP Fellow



Mansukh was very much an unsung “giant” in natural products chemistry, a humble and unassuming gentleman in the true sense of the word, in spite of his profound research accomplishments. Happy to play the “second” fiddle to Dr. Wall over many, many years at RTI, he was the spearhead organic chemist developing improved analogs of the unprecedented structure of camptothecin as well as taxol. He was charming

and patient, dedicated and persistent, with great insights. In addition to the many ups and downs of the development of taxol, imagine waiting 30 years for a derivative of your “hot” alkaloid to finally become a life-saving drug!! Everyone in natural products refers to those discoveries of camptothecin and taxol in justifying the isolation of potent biological agents from natural sources...I mean everyone!! That alone tells you his standing as a scientist. A very sad loss to his family, his many friends, the ASP, and to the community of natural products chemistry. It was an abiding honor to have been a collaborator with him for many years.

—Geoff Cordell, PhD  
ASP Fellow and Honorary Member



It is with profound sadness that I learned of Dr. Mansukh Wani’s passing. He was a role model for all young Indian scientists interested in pursuing careers in natural products, whom he encouraged enthusiastically. Dr. Wani was a humble and very amicable man to all with whom he interacted. I fondly remember our visit to his home in Durham when RTI hosted the ASP meeting. Both Ramila and Mansukh were gracious hosts. I have always admired his sincerity, kindness, warmth, and gentleness, and he never talked about his great achievements. His contributions towards the discovery of cancer drugs of natural origin has left an indelible mark. Dr. Wani was a great friend who will be missed dearly.

—Mahabir P. Gupta, PhD  
ASP Member



I’ve known Dr. Wani for a long while but, especially over the past 10 years or so, have spent a considerable amount of time with him. We traveled together to a variety of ASP conferences and seminars; we’d drive the 50 miles from RTI to UNCG to visit Nick Oberlies and, while driving, talk about science and different scientists we’d known. We shared a room at a couple of ASP conferences, and he was an easy-going roommate and great company. He liked to talk about his early life in India and about India’s independence from Britain, what I was doing in my lab, his career at RTI, invariably taxol and camptothecin and the people involved. When we met at my lab, Mansukh

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## Celebrating Mansukh C. Wani

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would make a point of coming in to speak to everyone here. When we were together in India, it was remarkable to see how everyone, but especially the students, would flock around him. He was genuinely loved by so many, and the respect they showed to him was reciprocated. He didn't let the fame associated with his great discoveries get in the way of him being a kind and generous person.

—Cedric Pearce, PhD  
ASP Past President



I'm a beneficiary of Dr. Wani's work on camptothecin and taxol in so many ways – personally and professionally. But most of all, Dr. Wani taught me by example of how to be a diligent, gentleman scientist and compassionate member of society. His relentless attention to detail and humility with audiences from scientists to children taught me that while we work for scientific accomplishment, we also work for humanity and the relief of human suffering.

For anyone who says taxol is “an old drug” – discovered in 1971 and FDA-approved in 1992 – I offer this final anecdote: When my own mother was in her last year of a 2014 breast cancer recurrence from 30 years earlier, it was Dr. Wani's taxol that gave her the last three months of freedom from metastatic disease in 2018 and allowed my sister and I to celebrate her life with her in New Mexico. We all strive for our work to make an impact on the field, but few can achieve the stature conferred by discovering not one but two classes of natural product medicines. That's amazing on its own. But the message I have for ASP members – investigators and students alike – is that Dr. Wani's offering to us was not just his scientific prowess but his equivalent ferocity in human compassion and connection that render sterile scientific accomplishments gifts for humanity.

—David J. Kroll, PhD



In April of 2016, we at the University of Wisconsin-Madison School of Pharmacy were honored to host a special lecture by Dr. Wani highlighting his many historic discoveries of anticancer agents. It was wonderful to have Dr. Wani back on campus and hear him fondly recall stories of his postdoctoral days here

from 1961 until his departure in 1962 for the then recently established Research Triangle Institute in North Carolina.

—Steven M. Swanson, PhD  
ASP Member



Every day I work with young scientists who are passionate about natural products drug discovery, but who face the inevitable challenges and discouragement that goes along with scientific research. I have never seen my students so inspired as they were in the presence of Dr. Wani.

The image of all of them crowded around him as he told stories about early days of taxol and camptothecin is burned in my memory. He would speak quietly and carefully, always leading up to a great punchline, and then laugh along with them, his eyes crinkling at the corners. I remember in particular one joke that he loved to tell about how taxol, being discovered in the south and having a hydroxyl functionality, could have been called “yew-ol” (as in ya'll). This story usually took about 20 minutes to tell, and even those of us who had heard it many times sat transfixed by the twinkle in his eye and hung on his every word.

Dr. Wani remains an inspiration to us all, not just because of the scientist he was but because of the person he was. His impact is impossible to quantify (even for this analytical chemist) because it is so far reaching, going well beyond the number of lives saved by taxol and camptothecin. He serves as an example to countless aspiring scientists who continue doing natural products research because Dr. Wani showed them that it can change the world.

—Nadja B. Cech, PhD  
ASP Member



Mansukh Wani is one of the most genuinely modest people I have ever known. He would rather spend 15 minutes praising the work of others than one-minute recounting his own extraordinary accomplishments. I was honored to represent the ASP

when the American Chemical Society made the RTI a national chemistry landmark, and I consider it one of the highlights of my career to have worked on a joint project with Drs. Wani and Wall.

—John Cardellina, II, PhD  
ASP Fellow and Honorary Member



## ASP Diversity and Inclusion Committee Call to Action

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Here we offer the first steps for members to take and summarize several initiatives that our committee is championing.

### A FEW FIRST STEPS YOU CAN TAKE

**1** If you are a group leader, complete this form: [forms.gle/LKKfApe3caxJjnCT6](https://forms.gle/LKKfApe3caxJjnCT6) (it only takes about three minutes!) by providing information about your research interests and location. Graduate students and postdocs, encourage your PIs to complete it as well. The data will be entered into a map that will be available on the ASP's website to help match prospective students with appropriate graduate programs in pharmacognosy, natural products, and related disciplines. This map, which was created by ASP members Brian Murphy and Chase Clark (with financial support from the ASP) as part of our effort to educate the community about research opportunities in the field of natural products, will be a critical resource to ASP ambassadors as we build bridges to marginalized or underrepresented communities.

**2** Have a conversation with your lab group about creating an inclusive lab environment. Such a conversation can be initiated by group leaders or group members. We recommend making sure that in such conversations all group members are allowed to contribute, i.e. by specifically going around the room (or zoom) and giving each person the floor, one by one. Listening is key. You might choose an article to assign for such conversations. Here are some resources:

[www.pubs.acs.org/doi/10.1021/acscentsci.0c00784](https://www.pubs.acs.org/doi/10.1021/acscentsci.0c00784)

[www.academics4blacklives.com/](https://www.academics4blacklives.com/)

[www.pnas.org/content/117/17/9284](https://www.pnas.org/content/117/17/9284)

[www.chronicle.com/article/I-Was-Fed-Up-How/248955](https://www.chronicle.com/article/I-Was-Fed-Up-How/248955)

**3** Donate funds. We are preparing to launch an undergraduate summer research assistantship program to increase the representation of Black, Indigenous, and People of Color (BIPOC) (including members of the LatinX, Black, African American and Native American communities) in the field of scientific research related to natural products. This program will fund summer research experiences for students from groups that have historically been underrepresented in our membership. In designing this program, we recognize the interconnectedness of social categorizations such as race, class, and gender and will seek particularly to support those who may be dis-

advantaged or underrepresented as a result of intersectionalities, such as BIPOC students who are also women, economically disadvantaged, or LGBTQIA+. Details on how to donate to this fund will be provided shortly.

### ACTIONS BEING TAKEN BY THE ASP DIVERSITY COMMITTEE

The ASP Diversity Committee, which has been active since 2018, is working on initiatives related to three major goals: (1) build the pipeline that overcomes structural barriers of entry for underrepresented groups wishing to engage in natural products research, (2) work with members of the ASP to create a more equitable, inclusive, and supportive community, (3) recognize and highlight the contributions that members from underrepresented communities make to the ASP. Some of these programs are already underway (i.e. the ASP Ambassador's Program), others are still in the planning stages.

#### 1. Build a Pipeline to Overcome Structural Barriers of Entry

**a.** At the ASP Meeting in the Summer of 2019 (Madison, Wisconsin) we launched the ASP Ambassador's Program. Three ASP Ambassadors (Drs. Christine Salomon, Katherine Zink, and Sandra Loesgen) were appointed and are working (with support from the ASP) to increase participation of individuals from underrepresented groups in our society. For more about this program, see Brian Murphy's article ([www.pharmacognosy.us/wp-content/uploads/ASP-Newsletter-55\\_3.pdf](https://www.pharmacognosy.us/wp-content/uploads/ASP-Newsletter-55_3.pdf)).

**b.** We launched the Natural Products Career Locator App, an interface that provides resources for students to research natural products-related programs in their area of interest: [www.pharmacognosy.us/natural-product-programs-and-research/](https://www.pharmacognosy.us/natural-product-programs-and-research/).

**c.** We are preparing to launch a new summer undergraduate research program as described above to provide BIPOC individuals equitable opportunities to advance their careers in the ASP.

#### 2. Create an Equitable Community/Educate

**a.** We plan to work with the ASP Executive Committee and the ASP Foundation to create a new award for ASP members who have demonstrated an outstanding track record for mentorship.

**b.** We plan to include a panel as part of the ASP webinar series that will discuss creating inclusive lab environments.



## ASP Diversity and Inclusion Committee Call to Action

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- c. We worked with organizers of the meeting in Madison, Wisconsin to provide a workshop, “Breaking the Bias Habit” by Jennifer Sheridan (Women in Science Leadership Institute, University of Wisconsin – Madison). The workshop was well attended and received by our membership, and we plan to work with ASP members to provide similar programming at future meetings. Please share programming ideas you may have!
- d. For the ASP meeting in Madison, WI, we drafted and introduced a new anti-harassment policy that has now been adopted by the Society ([www.aspmeetings.pharmacognosy.us/wp-content/uploads/2019/01/ASP-Code-of-Conduct.pdf](http://www.aspmeetings.pharmacognosy.us/wp-content/uploads/2019/01/ASP-Code-of-Conduct.pdf)).

### 3. Recognize and Highlight Contributions from Underrepresented Groups

- a. We are seeking to increase the number of undergraduates and graduates from underrepresented groups who receive travel funding to present at ASP meetings.
- b. We are working with Edward Kennelly, editor of the ASP Newsletter, to regularly highlight the contributions of underrepresented groups to the ASP. We will provide educational materials and direction for members seeking to become more involved in our efforts to create a more just and equitable society as part of a new regular column, “Taking Action: Addressing Racism and Inequity in Science.” Anyone interested in writing for the ASP newsletter should contact Dr. Kennelly at [asp.newsletter@lehman.cuny.edu](mailto:asp.newsletter@lehman.cuny.edu).
- c. The ASP Diversity Committee is working with conference organizers to ensure that the presenters at ASP meetings include sufficient representation of women, people of color, and others from historically underrepresented groups. We welcome suggestions for speakers at future meetings!

We, the ASP Diversity and Inclusion Committee Members and the ASP Ambassadors, endorse the ideas and actions presented in this article and look forward to partnering with our members to bring them to fruition. We would also love to hear your ideas and welcome you to reach out to us.

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Diversity and Inclusion Committee Co-Chair

**We, the members of this committee, explicitly state that  
BLACK LIVES MATTER.  
To our Black students, colleagues, and friends, we see you,  
we support you, we value you, and we commit to doing better  
to make the ASP a more equitable environment.**

# ASP Issues Statement on Racism

By Edward Kennelly, PhD

**O**n June 3, 2020, the ASP Executive Committee issued a strongly worded statement about racism in response to the killing of Mr. George Floyd on May 25 in Minneapolis and the subsequent discussion of systemic racism in the United States that ensued. The statement is reprinted in this edition of the *Newsletter* and is also available at the ASP website [www.pharmacognosy.us](http://www.pharmacognosy.us). Statements by the ASP Executive Committee addressed to all members are rare, and this is the first to confront racism directly.

In the five-paragraph statement, ASP expressed outrage over the Floyd killing and other injustices, “We condemn the continued police brutality against black, brown, and indigenous people of color (BIPOC).” The statement referred to the work on racial equity by Union of Concerned Scientists, a US-based nonprofit science advocacy organization, and pledged that ASP will work more on this issue.

The statement pointed out that ASP scientists work to improve the lives and environment of everyone, and it is imperative that ASP members recognize institutional and structural racism in all of its varied forms. “The responsibility to address these inequities lies with all of us.”

## “We condemn the continued police brutality against black, brown, and indigenous people of color (BIPOC).”

After reading the statement, ASP member Dr. Lesley-Ann Giddings wrote in an e-mail, “You have no idea how proud it has made me feel to be a part of a professional society that acknowledges the pain and suffering of my community. Importantly, it seems like ASP wants to take action to address the problem of dismantling racism.”

About a decade ago, the *ASP Newsletter* ran a series of articles on the “Changing Face of ASP,” and in volume 45, issue 1, Dr. Phillip Crews, along with Ms. Karen Tenney and input from ASP Fellow Dr. Gordon Cragg, discussed underrepresented minorities in ASP [www.pharmacognosy.us/wp-content/uploads/ASPv45i1v5.pdf](http://www.pharmacognosy.us/wp-content/uploads/ASPv45i1v5.pdf). They addressed many fundamental issues facing ASP members of color and discussed how pharmacognosy has been informed fundamentally by the knowledge of BIPOC and made specific recommendations on changes ASP could implement to start to address racism.

In a follow-up e-mail on June 17, Dr. Crews wrote, “While we ponder the tragic events of the last month, I urge, as a person of color, that the ASP, led by the Diversity and Inclusion Committee (currently comprised of seven dedicated members), take a more visible leadership role. Changing the current landscape to make real progress on diversity and inclusion and eliminate injustices is now urgent. During the past decade, ASP has made progress on addressing diversity concerns, but little headway has been made on dealing with issues directly relevant to under-represent-

ed minorities (URMs). In the spring of 2009 three of us (Tenney, Cragg and myself) contributed to an *ASP Newsletter* article that examined diversity within the society and how to increase participation by people of color. At that time, we made the following recommendations: (a) the ASP should assess the extent that URMs are engaged in the society, (b) the ASP should formulate a plan to increase representation and diversity in the society, and (c) the ASP should establish working groups to document achievements of URM members. Since then, from my perspective, there has been modest progress to showcase the contributions of ASP URM professionals. This is important because such individuals represent valuable role models for the next generation. It is now time for our society to regroup not only with words (from committees) but also to engage through solid accessible actions.”

In fact, the 2020 ASP statement closes with a call to action for ASP members. The ASP Diversity Committee is developing concrete actions that will be shared with members. The *ASP Newsletter* has been contacted by the Diversity and Inclusion Committee, and Editor Kennelly has indicated his willingness to expand coverage on issues of racial concerns and has made suggestions of potential articles. If any ASP member

has suggestions on how the Society can work to address issues of racism, please contact the ASP Diversity and Inclusion Committee or President Barry O’Keefe.

ASP Diversity and Inclusion co-chair Dr. Esther Guzman wrote in an e-mail to the *Newsletter*, “Black lives matter. It is really important to support black scientists, now and all time; to let them know they are valued members of our country and our society. I applaud ASP for taking this stance and making a strong public statement confirming this stance. I hope our words remind all Black Americans that we do not condone the violence perpetrated against them, and that our voices let them know that they are not alone. At ASP, we are making efforts to increase our inclusivity and representation of all members. While we still have a lot of work to do towards that goal, I am proud of being a member of a society that has that goal.”

The idea for an official ASP statement was initiated by the ASP Diversity and Inclusion Committee. President O’Keefe agreed to the concept and recommended that Dr. Christine Salomon draft the statement. The draft was passed by the Diversity Committee for review and revision and some minor edits by President O’Keefe. The ASP Executive Committee was then asked for an up-or-down vote on its release and quickly and unanimously voted in favor of releasing the statement as written. ASP Business Manager Laura Stoll posted the docu-

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## ASP Issues Statement on Racism

**The statement pointed out that ASP scientists work to improve the lives and environment of everyone, and it is imperative that ASP members recognize institutional and structural racism in all of its varied forms.**

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ment on the ASP webpage, all ASP social network accounts, and sent it by e-mail to all ASP members on June 3.

When asked to comment on the ASP statement, President O'Keefe wrote, "I consider it an honor to be able to support the ASP and its members towards action in trying to build a more equitable society. The statement put out by the ASP, which was initiated by the Diversity and Inclusion Committee, is just one step on that path. I strongly support the statement by the ASP and look forward to the actions that follow from our Society. I feel that the American Society of Pharmacognosy, due to the history of exploitation of black, brown and indigenous peoples of color by natural product researchers in the past, needs to be especially motivated to work to improve the scientific, economic and societal position of those same communities."

A number of ASP members interviewed for this article commented on the close association between pharmacognosy research and BIPOC. For example, many ASP members rely on the traditional knowledge of BIPOC to develop research questions that are tested in laboratories. ASP Honorary Member Dr. Roy Okuda noted, "One thing unique about pharmacognosy is that it often requires collaboration with people from other parts of the world, such as Latin America, Africa, and Asia. Working with colleagues from other cultures on a routine basis leads naturally to mutual understanding and respect."

Dr. Nadja Cech, the co-chair of the ASP Diversity and Inclusion Committee, wrote about the importance of the ASP statement to her personally in an e-mail to the *Newsletter*, "... it shows that we (the ASP) support and are part of the black lives matter movement. Black lives matter is very important to me personally. I care deeply about the well-being of my black colleagues and students. I am proud to work beside them as a fellow scientist, and I see every day how our scientific endeavors benefit from their creativity, innovativeness, and commitment. The statement by the ASP is important because it is aspirational; it's about the society we want to become. We

have a long way to go. Our statement is important because it invites all of us to hold each other accountable for getting there. Words are important, but what really matters are the actions we take, every minute of every day. I look forward to continued action with my colleagues at the ASP"

Dr. Gordon Cragg, who chairs the ASP Fellows, noted, "The ASP Fellows applaud members of the ASP Diversity Committee for initiating programs such as the Ambassadors Program, which is 'a recruitment effort targeted at URM [underrepresented minority] scientists, designed to expand our pipeline of those who engage in natural products research.' The Fellows look forward to meeting with ASP President Barry O'Keefe and some members of the Diversity Committee at their 'virtual' meeting on July 27 to discuss how best they can contribute to the success of such programs, as well as addressing the important issues raised in the statement from ASP Executive Committee."

The statement has resonated not only with ASP members but with other organizations. The Lloyd Library, which has had a long-standing relationship with ASP originally through the society's flagship publication, *Journal of Natural Products* (formerly *Lloydia*) and housing the ASP archives, issued a message in June that quotes from the ASP statement and is signed by the Lloyd's executive director and board president. This statement has been posted on the ASP website [www.pharmacognosy.us/message-from-the-lloyd-library-and-museum/](http://www.pharmacognosy.us/message-from-the-lloyd-library-and-museum/).

ASP's sister scientific organization, the Society for Medicinal Plant and Natural Product Research (GA), issued a statement on June 5 signed by their executive council and endorsed by the entire GA board. GA President Dr. Judith Rollinger wrote in a June 7 e-mail to ASP President O'Keefe that members of the GA were shocked by the current situation and wrote a statement in part to support the initiative of the ASP. President O'Keefe noted he was very heartened by the GA letter of support, and it has been posted on the ASP website [www.pharmacognosy.us/wp-content/uploads/2020\\_GA-Statement.pdf](http://www.pharmacognosy.us/wp-content/uploads/2020_GA-Statement.pdf). ■

**...we made the following recommendations:**

- (a) the ASP should assess the extent that URMs are engaged in the society,**
- (b) the ASP should formulate a plan to increase representation and diversity in the society, and**
- (c) the ASP should establish working groups to document achievements of URM members.**

# To Our ASP Friends, Family, and Community

## ASP Official Statement

**W**e are devastated and outraged over the murder of George Floyd in Minneapolis last week, and of the countless inhumane injustices that preceded it and continue to this day. We condemn the continued police brutality against black, brown, and indigenous people of color (BIPOC).

The ASP leadership stands in strong support and solidarity with our BIPOC members and their families, and especially with those who have been affected by police brutality and other structural violence. Drawing from the [Union of Concerned Scientists](#), we are committed to working for racial equity *“because we are human beings who believe in justice, and we want our work to reflect that belief”*.

As scientists, we are called to our work to cure diseases, to understand the biology and chemistry of life, and ultimately, to improve the lives and environment of everyone on this planet. As leaders, we are called to recognize institutional and structural racism, systemic violence, and the vast inequities that enable continued exploitation and oppression. We recognize that marginalized groups do not

always have the privilege of separating their science from their life outside the laboratory and are committed to changing this reality. Individuals from these communities are often unfairly imprisoned and continue to lack equitable access to health-care, housing, and education. The responsibility to address these inequities lies with all of us.

The work ahead requires more than words of comfort and platitudes. It is at times uncomfortable and requires not only a commitment from our society, but also from each of us as individuals to take action in many different ways, using our myriad talents, resources and positions of leadership and privilege. In the coming weeks, the ASP Diversity Committee will be sharing suggestions for concrete actions and available resources to become better informed. We ask for your energy and creativity to strive for racial justice in both our personal and professional lives.

Let us work together to ensure human rights for People of Color. The time is now. ■

—The ASP Executive Committee



American Society  
of Pharmacognosy

# GA Supports ASP Statement on Racism

Society for Medicinal Plant and Natural Product Research



Gesellschaft für Arzneipflanzen- und Naturstoff-Forschung e.V.

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**Subject: George Floyd**

Dear ASP President, dear Barry,  
dear ASP board, dear ASP members,

June 5, 2020

As researchers in all aspects of medicinal and natural product research we - the Board of the Society for Medicinal Plant and Natural Product Research (GA) recognise the tremendous human diversity on this planet. As scientists and as citizen of the world's countries, we must stand up for people of all colours / ethnicities, religions, beliefs, personal orientation irrespective of gender and age.

As the Board of the GA, we are aware of existing inequities a social minority faces both in their personal and professional life and in all countries. Therefore, with this statement we join our sister organisation - the American Society for Pharmacognosy (ASP) - in strongly supporting scientists of all backgrounds in their struggle for justice as well as against violence and discrimination. We support scientists to form global networks and we strive for diversity in every aspect, as we also value the many opportunities this brings.

We as the Board of the GA deplore the brutalities against black people, as well as against any other minority like indigenous peoples or Hispanics (Chicano Boricuas) whether it is in the USA or any other country. George Floyd is, sadly, the most recent of far too many victims.

The world suddenly entered a period of great uncertainty in terms of global health. Science is a key foundation for evidence-based solutions globally. We call upon governments to ascertain that the focus is directed on improving the health of a nation's people and supporting them. Black, Indigenous and other 'minorities' are hit particularly hard by the global pandemic. The focus needs to be on developing evidence-based solutions to these challenges on the basis of mutual respect and on empowering the people improving their lives and health. We are in solidarity with those affected by violence and with our partner organisations in the USA and beyond who call for ethnic equality.

On behalf of the Board of the Society of Medicinal Plant and Natural Product Research (GA) – Judith M. Rollinger (president), Anna-Rita Bilia and Michael Heinrich (vice presidents), Olaf Kelber and Bernd Roether (ExCo members)

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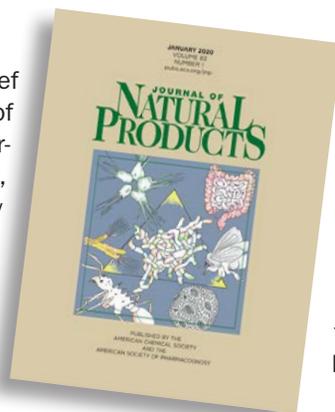
# Journal of Natural Products with Other ACS Journals Confront Racism in Publishing

By Edward Kennelly, PhD

The *Journal of Natural Products* Editor-in-Chief Dr. Phil Proteau, along with 67 editors of other American Chemical Society (ACS) journals, published an editorial on June 19, 2020, entitled “Confronting Racism in Chemistry Journals.”<sup>1</sup> The *Journal of Natural Products* is the flagship journal of the ASP, and since 1996 the society has co-published it with the ACS.

ASP President Dr. Barry O’Keefe wrote in an e-mail, “I was happy to see the American Chemical Society come out with their statement of action condemning systemic racism and violence against Black Americans. By committing to improve the treatment and representation of Black Americans, improve transparency in ACS journal actions, and improve diversity in their journal management and publishing, ACS has set measurable goals for the future. It was important to see Dr. Philip Proteau, editor of the *Journal of Natural Products* and former American Society of Pharmacognosy Executive Committee member, in the list of those responsible for the document and committing to this plan of action. It is clear that the current level of public engagement on this issue has provided a window of opportunity for constructive action. I am heartened that both the American Society of Pharmacognosy and the *Journal of Natural Products* are stepping up to respond to that opportunity.”

The one-page joint editorial, published simultaneously in each of the 61 ACS journals including the *Journal of Natural Products*, begins by addressing systemic racism and specifically the killing of George Floyd. “The Editors, Staff, and Governance Members of ACS Publications condemn the tragic deaths of Black people and stand in solidarity with Black members of the science and engineering community. Moreover, ACS condemns racism, discrimination, and harass-



ment in all forms.”

The editorial considers the effects of the race and gender of authors on scientific publications, and while they do not cite ACS-specific data, they point to a *PeerJ* publication that found “unprofessional reviewer comments had a disproportionate effect on authors from underrepresented groups.”<sup>2</sup> They further note that “no ACS journal is currently led by a Black Editor-in-Chief.”

The editorial promises that ACS will take five specific actions, including gathering better statistics about diversity in its journals; enhancing the training of editors; providing explicit benchmarks for editors to increase diversity; creating a new position of ombudsperson; and requiring an actionable diversity plan for each ACS journal. According to Editor Proteau, an actionable diversity plan is being developed for the *Journal of Natural Products* per the ACS directive, and should be finalized later this year.

According to Proteau, the *Journal of Natural Products* does not track author demographics, aside from countries and institutions, nor does the journal ask authors to self-identify race/ethnicity. ACS may have other data they collect from authors, but they have not shared this with the editors.

In addition to Editor Proteau, the *Journal of Natural Products* has three associate editors, Drs. Joanna Burdette, Daneel Ferreira, and Cedric Pearce. Dr. Doug Kinghorn is the editor emeritus, and Dr. Melany Puglisi-Weening is the book review editor. The Editorial Advisory Board has 30 members, representing 11 countries; currently, 11 EAB members are women.

Perhaps the only US Black scientist listed on the *Journal of Natural Products* masthead is ASP Fellow Dr. Phil Crews. In an e-mail communication with the *Newsletter*, Crews wrote, “It is time for the managers of the

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**“The Editors, Staff, and Governance Members of ACS Publications condemn the tragic deaths of Black people and stand in solidarity with Black members of the science and engineering community. Moreover, ACS condemns racism, discrimination, and harassment in all forms.”**

**The editorial promises that ACS will take five specific actions, including gathering better statistics about diversity in its journals; enhancing the training of editors; providing explicit benchmarks for editors to increase diversity; creating a new position of ombudsperson; and requiring an actionable diversity plan for each ACS journal.**

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*Journal of Natural Products* and the other more than 50 periodicals in the ACS portfolio to be more aggressive in adding diversity to the journal leadership. This will make it easier [for] me and other educators to highlight examples of achievements by gifted black colleagues. For starts, this is sorely needed to encourage the next generation of black ASPers and empower them to build on contributions from a small list of past ACS luminaries of color, such as Dr. Percy Julian, whose careers were based on natural products discovery.”

This ACS editorial came after a controversial statement made in *Angewandte Chemie*, a journal of the German Chemical Society published by Wiley, in a now-deleted essay on the state of organic synthesis by Tomáš Hudlický of Brock University. In this essay to celebrate the birthday of organic chemist

Dr. Dieter Seebach, Hudlický argued that efforts to increase diversity only served to weaken organic synthesis research. This article, published on June 4, has been removed, and the Editorial Board of *Angewandte Chemie* has issued an apology, “The article should have never been published.” Hudlický works on natural product synthesis and was an invited speaker to the 50<sup>th</sup> ASP Annual Meeting in Honolulu in 2009. A search of the ACS publications page indicates he has published two book reviews and four research articles in the *Journal of Natural Products*, the most recent was in 2018.<sup>3</sup>

ACS has set up a page for the broad chemistry community to share ways it can improve its journals, including the *Journal of Natural Products*. Comments can be submitted to [www.axial.acs.org/2020/06/19/editorial-feedback/](http://www.axial.acs.org/2020/06/19/editorial-feedback/). ■

**“It is time for the managers of the *Journal of Natural Products* and the other more than 50 periodicals in the ACS portfolio to be more aggressive in adding diversity to the journal leadership.”**

—Dr. Phil Crews

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# ICNPR 2020

## Thanks and Final Comments

By Roy Okuda, PhD

The planning for ICNPR 2020 began about four years ago, after the 2016 Joint Conference in Copenhagen. As ASP president at the time, Ed Kennelly had informally polled colleagues from other parts of the world to see where they would like the next US conference to be held. He called me to say that San Francisco was the near-unanimous choice, and thus ICNPR 2020 came to be.

While it is extremely disappointing to cancel ICNPR 2020, many colleagues put in a great deal of time to plan this event. We had a goal of organizing a memorable international event for our field on the banks of San Francisco Bay. Our plans were reaching completion, but sadly, COVID-19 resulted in a fatal disruption of the Congress. We could not hold our meeting if we could not guarantee the safety of everyone who would have attended ICNPR 2020.

As we wind down the Congress, I would like to express my deepest appreciation to those who spent many hours to plan ICNPR 2020. I was extremely happy to have both Ed and Guy Carter - the two leaders of the highly successful ICNPR 2012 in New York City - to take on the role of scientific program chairs. We had expected the San Francisco meeting to be larger than the New York meeting (which had 1301 registrants), especially with a total of seven participating societies, so coming up with a program that accommodated many interests was a daunting task.

Along with the members of the scientific program committee – Drs. Nadja Cech, Stefan Gafner, Rachel Mata, Susan Mooberry, Barry O’Keefe - and with the participation of the other societies, a highly inclusive and unique program had been developed. The program assured a balanced list of speakers from all standpoints, including gender, diversity, geographical origin, etc. It took the program committee a great deal of time and effort to craft this program. All of the invited speakers accepted their invitation, and they were an excellent representation of the field of natural products today. I am highly ap-



preciative of their willingness to join in the ICNPR program.

In addition to the scientific program committee, I also want to acknowledge the local program committee – Drs. Taro Amagata, Scott Baggett, John Kim, Nam-Cheol Kim, Shichang Miao, and Laura Miller Conrad, who were poised to work very hard during the meeting with logistical support. I specifically want to thank Shichang, who is president of a very large, local biotech professional group ([www.pbss.org](http://www.pbss.org)) and was helping us get inroads into the San Francisco Bay biotech community, which I had hoped would join us.

At the time of our cancellation, we had good results with fundraising from many sponsors and exhibitors. Waters, Inc. was the largest sponsor at the Presidio level and was in the process of planning an additional event. Thanks to Dr. Cindy Angerhofer, Aveda provided a very generous sponsorship. Registered exhibitors were: Advion, Biotage, Cfm Oskar Tropitzsch GmbH, CRC Press, Gilson, Jeol, MDPI, Millipore Sigma, Teledyne ISCO,

Yamazen, and Waters. I would like to thank all of these organizations for your willingness to be a part of ICNPR 2020.

In addition, the ASP Foundation agreed to be a very generous sponsor of the special Memorial Symposium for Drs. Koji Nakanishi and Yuzuru Shimizu. We will lose the opportunity to honor them this summer, but hopefully another forum will occur soon where we can remember them along with Dr. Mansukh Wani who passed away in April.

*continued on page 19*



San Francisco Hyatt Regency lobby displays the sculpture *Eclipse*, an anodized aluminum sphere.

**We could not hold our meeting if we could not guarantee the safety of everyone who would have attended ICNPR 2020.**

# ICNPR 2020

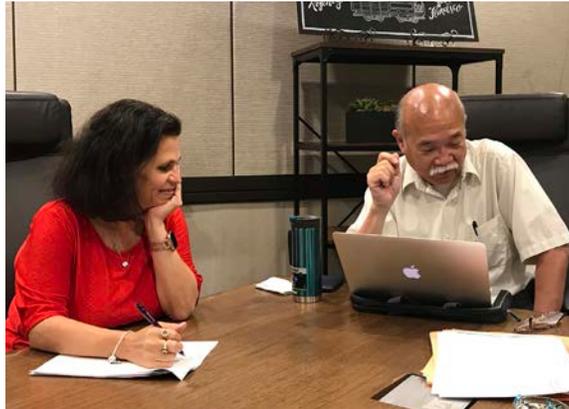
## Thanks and Final Comments

*continued from page 18*

My right-hand, left-hand, and both feet in planning our Congress was Laura Stoll, ASP business manager. Laura handles ALL of the logistical work involved in our meetings, including contracts, venue selection, food and beverage, budget, hotels, speaker issues, registration, etc., etc. - in short, she does everything. I would not have agreed to take on planning this large event without her help. Many thanks and kudos to Laura!

When it became clear that a meeting would be impossible to hold, ASP President Barry O'Keefe began the delicate process to negotiate cancellations of multiple contracts. I'm happy to report that, thanks to Barry's efforts, the impact to ASP's budget is relatively minor. Great job, Barry!

Over the years leading up to 2020, the *ASP Newsletter* and ASP website have been very helpful in disseminating information



### CLOCKWISE

Laura Stoll and Roy Okuda at work; Guy Carter during a planning meeting for ICNPR 2020 in San Francisco in September, 2019; Ed Kennelly.

on the Congress. I would like to thank Ed and Trish Carver for help with the *Newsletter* and Laura and Jason Evans for their help in updating the ASP website as well as the ICNPR website.

Again, I want to thank everyone and every organization who participated and contributed to ICNPR 2020 in any way. I personally had been looking forward to seeing everyone in San Francisco this summer and am sorry we cannot host you. However, in just about two months, the entire world has changed and will remain changed for some time. Today, our overriding concern is to take care of ourselves and our loved ones. Everyone, please stay safe and healthy! ■

**However, in just about two months, the entire world has changed and will remain changed for some time.**

## ASP Annual Meeting Goes Virtual

*By Patricia Carver, MA*

**F**or the first time in ASP history, the society will hold its annual business meeting online this year. As a result of COVID-19 and the cancellation of ICNPR 2020, ASP will hold the meeting via Zoom on **Monday, July 27, 2020** from 2 – 4 PM Eastern Time.

ASP Business Manager Laura Stoll will send the Zoom registration link to all members shortly, so

please make sure that your 2020 dues have been paid and your profile is up to date at [www.asph.memberclicks.net/login](http://www.asph.memberclicks.net/login).

The society also is planning the ASP 2020 Younger Members Virtual Symposium to take place from **August 11 – 13**.

Please keep an eye on your e-mail for further details regarding both meetings. ■

# ASP Webinars

## How to Stay Connected During a Pandemic

By Sandra Loesgen, PhD

For the first time in its history, ASP is holding a series of webinars on natural product sciences. The webinars are free to members and trainees, but registration is required at: <http://www.pharmacognosy.us/natural-product-sciences-webinar/>.

In light of the pandemic and the canceled annual meeting, ASP decided to create an opportunity for members to connect virtually. It began with an e-mail to ASP president Barry O'Keefe on April 5, 2020 about the possibility of offering webinars. The idea took flight within days as Drs. BJ Philmus, Kevin Tidgewell, Emily Mevers, Chris Thornburg, and I (all members of the recently envisioned ASP social media committee) transitioned into the ASP webinar committee.

We made our best efforts to give representation to a variety of different areas of research, along with representing the diversity of the scientists within the ASP. Another goal was to have balance with respect to gender among our speakers, and with 60% female speakers thus far, we think that the webinars have done a great job, and we are striving to continue this trend.

Speakers were paired to highlight new and well-known research topics. We have tried to avoid institutional and "heritage" bias, with researchers speaking from across the US, and, as the summer progresses, we will cover research from our sister societies whom we were supposed to network with at the ICNPR. We felt it was important to showcase the diversity within our soci-

ing the curve by decreasing the spread of SARS-CoV-2, supporting first line health care workers, and keeping our labs and communities safe. However, the side effects of WFH quickly became visible: we are blocked from our schools, laboratories, workplaces, and shared spaces.

This pandemic has impacted everyone – undergraduate and graduate students, postdocs, staff, faculty, research scientists in industrial and federal settings; all have been immensely impacted by the outbreak. Without knowing, we ran our last reaction, HPLC run, or NMR experiment months ago hoping the shutdown would only cause a minor delay, but it soon became clear that this pandemic was unlike anything we had ever seen before. Restaurants

### The COVID-19 pandemic has rapidly impacted researchers around the globe, and it will have lasting impacts.

With the support of ASP Business Manager Laura Stoll, we brainstormed the format and selected the speakers. We were able to hold the first ASP webinar within just three weeks of that original e-mail. We especially thank Drs. Valerie Paul and Brian Murphy for speaking on such short notice. This inaugural ASP Natural Product Sciences webinar was broadcasted on April 28, 2020 with over 300 participants from around the world.

Our idea of the ASP webinars was to keep our community connected by having regular webinars from diverse subfields of the natural product sciences community. The webinars are free to all trainees and ASP members. A small donation was requested from non-members, though many waivers were offered for researchers who could not afford the donation, and all funds received will support the ASP Foundation to fund future student travel awards.

ety in order to highlight the ASP's core values to younger members and those for whom these webinars may be their first glimpse of the ASP. While we understand that the webinar series is not perfect, we hope our efforts are appreciated, and we will continue to think about these aspects as we design future conferences and symposia.

At the last three ASP webinars, we averaged 300 attendees from around the globe. Twitter, LinkedIn, and Facebook were talking about #ASPwebinars @Pharmacognosy.us, and we envision the social media attention will help connect current ASP members, attract new ones, and shape the future face of the American Society of Pharmacognosy.

The COVID-19 pandemic has rapidly impacted researchers around the globe, and it will have lasting impacts. Most of us have been working from home (WFH) in one capacity or another. Initial priorities focused on flatten-

ing the curve by decreasing the spread of SARS-CoV-2, supporting first line health care workers, and keeping our labs and communities safe. However, the side effects of WFH quickly became visible: we are blocked from our schools, laboratories, workplaces, and shared spaces.

Many of our students are suddenly confined to small apartments, oftentimes far away from their support systems. Faculty members had to quickly shift their courses online. In addition, all summer research programs have been postponed and annual conferences cancelled, including the ICNPR 2020. We have all been forced to embrace virtual connections, and we will likely have a summer full of Zoom meetings, more than anyone had realized was possible.

As we are now entering the summer months, there is some light on the horizon as states are beginning to reopen slowly, and our research labs are starting to outline plans for a "new normal." One thing is certain, our future will look vastly different, but there are great opportunities within great challenges. ■

# Working in China

## Amid Staggering COVID-19 Lockdowns

By C. Benjamin Naman, PhD

**Author's Note:** The views expressed in this article are those of the author alone and not of any employer, government, or professional society.

I think by now most of us have had a topical overload on the ongoing global pandemic, so I hope to offer some different perspectives and information than you might already have read. I happened to depart China for a previously scheduled trip in mid-January, just before the pandemic was announced and its real impact began. Universities in China schedule the semester break around the Spring Festival, or Chinese (Lunar) New Year, and Ningbo University was long set to adjourn from January 13 to February 19. One of my colleagues graciously agreed to cover my classes for the first week of the spring semester so that I could attend the Gordon Research Conference on Marine Natural Products at the end of February before any of us knew that would be the last in-person meeting for the foreseeable future.

Life in China entered a “new normal” in April and May after months of lockdowns and closures, and I still do not expect to see domestic or international conferences happening for some time. When I was asked to write this piece by ASP Newsletter Editor Ed Kennelly, certainly we were living in a different circumstance than now. That was coincidentally one day before US President Donald Trump said, “It’s going to disappear. One day it’s like a miracle, it will disappear.” It is obvious now that was only wishful thinking, as was my plan to be in the office in early March. Ningbo University completed part of the delayed-start semester by online teaching, and resumed

classroom instruction and laboratory research in-person in May. Many uncertainties remain at the time of writing this article, which I will address further on along with some of my own reflections.

I think the world owes the Chinese government gratitude for taking stringent measures early to curb the outbreak of this new viral disease within their borders and delay its reach abroad. Precious time was provided to prepare for what was coming, though I am sad to say that most countries seemingly squandered the opportunity. The decision to truly lockdown the then epicenter city, Wuhan, restrict domestic travel, and even forbid social gatherings during the Chinese New Year Spring Festival was made before the virus was known to be global. Without having anyone else’s example to follow or case reports of the new virus to gauge the potential impact by, which other countries later had, the government acted based on its learning from past outbreaks. It is clear that the strict actions taken in China saved countless lives and significantly reduced the necessary duration of the lockdown and associated disruption to the lifestyle and economy of the nation. This truly provides me with some comfort and hope for our future ability to respond to emerging diseases.

When Spring Festival celebrations were canceled, it was also announced that Shanghai Disneyland was closed to guests, and an American friend of mine there relayed that the Shanghai Metro was running nearly empty. This was really the writing on the wall, as these statements would previously each be deemed unimaginable. To put that into perspective, Shanghai has a population approximately three to four times that

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ABOVE LEFT: Shanghai Metro Subway on a typical day. © C. BENJAMIN NAMAN

ABOVE RIGHT: Shanghai Metro Subway on Chinese New Year Day during the COVID-19 lockdown. REPRODUCED WITH PERMISSION FROM VLAD GILSDORF.

## Working in China: Amid Staggering COVID-19 Lockdowns

**It is clear that the strict actions taken in China saved countless lives and significantly reduced the necessary duration of the lockdown and associated disruption to the lifestyle and economy of the nation.**

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of New York City, but the metro was empty instead of being standing room only. Meanwhile, Disney is Disney everywhere and was turning away guests and revenue; and the Chinese New Year is a holiday likened to combining Thanksgiving, any or all of your preferred religious holidays, and New Year's Eve all in one – and gathering to celebrate it outside was forbidden this year. Typically, this is a seven day “golden week” national holiday, and the decision to prolong it and enact widespread lockdowns came coincidentally at the same time. It is generally considered that this is by far the worst time for a new communicable disease to emerge, since a massive human migration occurs annually to allow Chinese families to travel to meet distant relatives or together crowd tourist sites, and return afterward.

There was apparently some level of confusion from frequent change in the early days of the response that was nicely summarized in a topical joke shared broadly on Chinese social media. This loosely translated as, “I woke up two days ago with five days left in my holiday. Yesterday I had seven days left in my holiday. Today the holiday has 14 days left. I am really afraid to sleep now, I am not ready to retire.” The citywide lockdowns in USA and elsewhere could have learned from this early measure in China. My experience in California was equally confusing some two months later: the expected duration of lockdown, associated governing policies and practical implementation have changed relatively often and with short public notice. A close friend sent me a memorable American cartoon captioned “Go to sleep, everything will be worse in the morning.”

It seems that China weathered the storm from January to March and is now practically on the other side of it. Schools and businesses largely reopened in stages between April and May, and there is emphatic focus on the use of masks and gloves, frequent hand washing and use of alcohol-based hand sanitizers and cleaning sprays as we have seen elsewhere. There are also



**Students practice physical distancing when possible.**

PHOTOS REPRODUCED WITH PERMISSION FROM YANG LIU AND LU REN.

noticeable cameras practically everywhere you go in the major cities of China, and new smartphone apps were developed that are being used to track an individual's COVID-19 health status and GPS location, so verification of isolation protocols, contact tracing, and outreach to or communication with potential carriers identified through tracing are both possible and efficient. This should enable the rapid response of small-scale quarantine measures in the case of future re-emergence or new imported cases, and its

use has already limited transmissions.

Travel between the state-like provinces of the country now remains somewhat restricted, so one might imagine that the risk of re-emergence is more limited and able to be contained. The government is enacting widespread testing, even announcing this for the entire population (about 11 billion) of the first epicenter city, Wuhan. It is accordingly understandable that China may have successfully ended the lockdown period faster and with fewer casualties than America, despite being more than four times as populous. Widespread testing could provide much new information about asymptomatic carriers, especially if previous infections are detected by antibody-based tests.

The Chinese government at the end of March implemented a temporary but indefinite suspension of entry into the country by non-essential foreign nationals, even those with existing visas or residence permits. Accordingly, one of my earlier noted uncertainties pertains to when international students and foreign employees can return. Many international students are currently abroad and missing classes that have resumed in person. At the time of writing this article, it is unknown how they will be able to catch up when they do get back. Students in their terminal year, especially graduate students, wait to learn the plan for their degree completions. Meanwhile, maybe universally, faculty members and postdocs are unsure if scheduled termination dates

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## Working in China: Amid Staggering COVID-19 Lockdowns

**We must be responsible to not use divisive and targeted names such as “Chinese virus” or more racist ones that include “Wu Flu,” “Kung Flu,” and others that aim to be divisive and blame-casting or perhaps even incite hate and negative human behaviors.**

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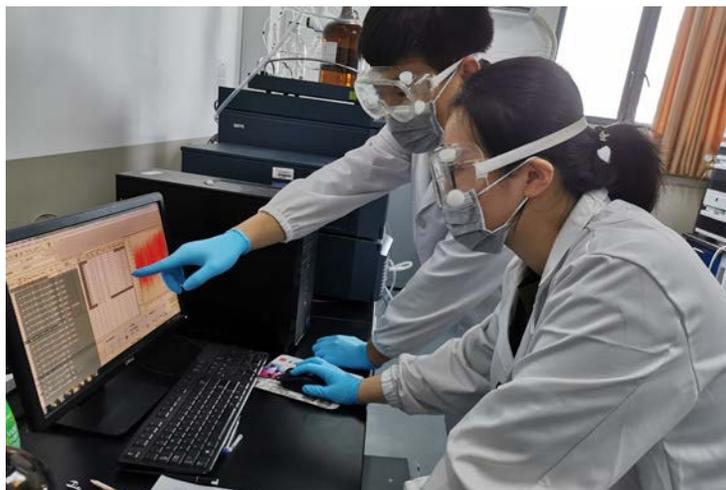
for funding or contracts will be extended. Progress reviews, promotion cases, and other career events are in question.

Outside of China, I have been hearing about furloughs, fears of forced early retirement, outright terminations and withdrawals of previously given or even accepted but not executed offers, in academic and industrial sectors at all levels. Ningbo University remains committed to recruiting international students, postdocs, and foreign faculty members, and I am actively involved in leading this effort for my College of Food and Pharmaceutical Sciences. I

do not know when in-person interviews will be possible again, or practical, however.

We now have a variety of interesting terms for this period in our lives, and I have become favorably attached to “The Great Pause of 2020,” mostly because we use pauses to think. We do not need to have the impact of Sir Isaac Newton to find meaning in this time, though. One thing on my mind that connects with natural products is the need for clarity of nomenclature. For example, the name of the pandemic disease is COVID-19, and it is caused by infection with SARS-CoV-2. The nomenclature was established by the International Committee on Taxonomy of Viruses and the World Health Organization (WHO), respectively.<sup>1</sup> This is important because the WHO issued in 2015 a new guidance of best practices for naming new human infectious diseases, citing that “certain disease names provoke a backlash against members of particular religious or ethnic communities, create unjustified barriers to travel, commerce and trade, and trigger needless slaughtering of food animals.”<sup>2</sup> We must be responsible to not use divisive and targeted names such as “Chinese virus” or more racist ones that include “Wu Flu,” “Kung Flu,” and others that aim to be divisive and blame-casting or perhaps even incite hate and negative human behaviors.

So what does responsible and accurate viral nomenclature



Students wear appropriate respirator-activated carbon masks while working to reduce volatile chemical and respiratory disease exposure.

PHOTOS REPRODUCED WITH PERMISSION FROM YANG LIU AND LU REN

have to do with natural products, you ask? Let us consider how many secondary metabolites have been assigned trivial names that are somehow misleading. This could regard the naming for compounds after a producing organism, in cases of taxonomic misidentification or later reclassification, misassumptions of production vs accumulation or contamination, or even artefactual generation. It may likewise reflect on differences in the ecological and pharmacological functions of

molecules, for example when the suffix “-toxin” is (somewhat counter-productively for preclinical development) fixed on drug lead candidates. Even structural relationships are not certain when considering many nominally different natural products in a compound family, or conversely structurally disparate metabolites named in a series format due to the geography of collection or observed taxonomy of the producing organism. The compounds named after people then might be considered to be less problematic, but remain chaotic in the grand scheme. Perhaps it is time that we as a society aim to establish best practices for the trivial nomenclature of new natural products. A community discussion would have been ideally initiated at the next annual meeting of the ASP and quadrennial ICNPR, but a different forum will be needed since this event was unfortunately, but appropriately, canceled.

While many people are questioning how to fill their days, it has been exciting to see the commonplace expansion of scientific literacy and science communication, scientific diplomacy and informed policy making in many countries, and intellectual discussion and debate over data. It is a work in progress for sure, but Drs. Birx and Fauci, some medical and epidemiological terminology, and the acronyms CDC and NIH have suddenly become parts of the American vernacular.

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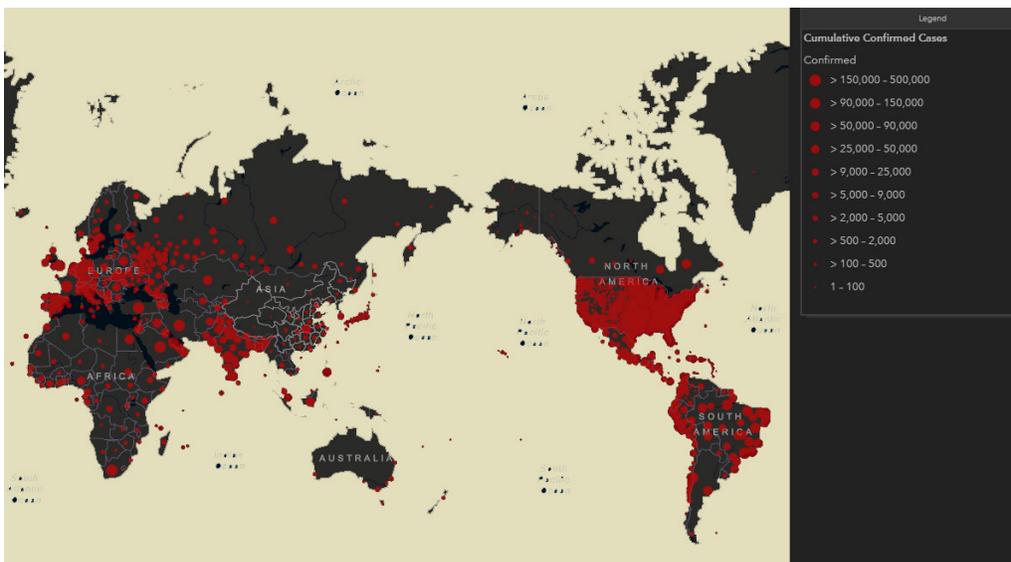
# Working in China: Amid Staggering COVID-19 Lockdowns

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Also along with the pandemic has come, unfortunately, the so-called “infodemic,” or widespread release of false and misleading information. Many ASP members have proudly taken up the call to help in applying the “sniff test” to media reports, and conveying clearly the data that has been flowing in from the worldwide scientific and medical communities. While some have been more rewarding and others more frustrating, these discussions and debates serve to lessen some harmful divisions and bring people together in knowledge and understanding.

We thankfully live in an era that offers great opportunity for scientists to also make impacts outside of the laboratory. With many institutions closed to non-essential personnel, the response has been truly overwhelming. I optimistically relay the message of Dr. Marga Gual Soler, who wrote, “This is a golden opportunity for scientists to engage with the public. We have an urgent responsibility to pass on our knowledge and expertise, but also our values. Science relies on openness, transparency and international collaboration. Promoting these values can pull down divisions and bring about the change we need to solve the problems of today and tomorrow.”<sup>3</sup> These interactions happen at the grass-roots level, special public outreach events, and also through explicit career opportunities. Interested individuals are encouraged to engage as well as seek out further education and training available through, to name a few, the American Association for the Advancement of Science (AAAS), the World Academy of Sciences, and the Warsaw Science Diplomacy School. I personally found learning about science diplomacy with AAAS to be an extremely valuable and rewarding week-long experience.

I chose to not apply for permission for my group to be on-site during the lockdown period in Ningbo. Instead, we primarily focused on several forms of virtual screenings, retrospective data analysis, and writing projects. With my best wishes, one of my MS students has been studying full-time to take the entrance exam for our PhD program. I echo many colleagues’ sentiments that the stark difference between “important” and “essential” mandated a health-conscious interlude for all away from the lab. That decision has certainly delayed publishing, for new submissions and also revisions, and may have untold impact on outstanding and future grant applications. However, with the assistance of Chinese government support and encouragement, we worked remotely. For example, we tested the predicted docking affinity of our natural product and



A global look at the COVID-19 case count per country as of July 8, 2020, divided by provinces and states in some cases.

(JOHNS HOPKINS CENTER FOR SYSTEMS SCIENCE AND ENGINEERING)

synthetic analogue libraries against published SARS-CoV-2 targets in what must have been record time after their initial disclosures, and there is a coordinated effort for *in vitro* validation in safely controlled facilities. There was then the incorporation of neural networks and artificial intelligence, based on earlier research with antibiotics,<sup>4</sup> to freely predict active structures and pharmacophores from the same libraries for SARS-CoV-2 inhibitors via the web, using some validated structures bioactivities of SARS-CoV inhibitors of similar function as a training set.<sup>5</sup> I expect that this type of new technological development will prevail long after the pandemic passes. The marine filamentous cyanobacteria that are growing in our laboratory culture collection survived the duration of the lockdown, finally revealing a silver lining to the slow growth rate of these intriguing organisms. In-person natural product chemistry research has now resumed with increased safety precautions, such as the wearing of masks in the office and at meetings; masks were already commonplace in the labs for more safely working with chemicals.

I am optimistic that we will get through this pandemic, albeit at different paces per country or even state, and then learn from the experience to prepare for the future. My friend Dr. Aaron Savio Lobo, member of the International Union for Conservation of Nature (IUCN) Marine Conservation Committee, had presented on “wicked problems” at a conference we both attended in December, 2019. This is a decades-old notion that stems from having a problem, especially in policy making, with great uncertainty and complexity in the categories of both causes and solutions.<sup>6</sup> Whether or not COVID-19 will stay in circulation, the global crisis faced during this pandemic is truly

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a wicked problem. Living through the experience will, without a doubt, change everyone for the foreseeable future. Past the death and hysteria, I have hope that we will collectively retain lessons learned in connectedness, thoughtfulness, and pacing. The recently established ASP Webinar Series has likewise been an accessible and positive development from our society, and I hope these will continue in the future. Many thanks to the organizers, each webinar disseminates knowledge, brings attention to our field, and should help to grow the membership of the ASP.

I will close with one more result of musing and discussion

among colleagues: I hope that our leaders can be helped to recognize the current and future value of natural products research in the search for and development of new treatments for existing and emerging communicable diseases, including those resulting from viruses, (potentially antibiotic-resistant) bacteria, fungi, and parasites. A relatively small fraction of the monumental \$2.2T stimulus spending could go a long way in generating new cures, new R&D jobs and revenue, and new knowledge along the way. As ASP Fellow Gordon M. Cragg has said many times throughout his outstanding career, "Natural products to the rescue!"<sup>7</sup> ■



Global scientists, diplomats, and policy makers came together at the AAAS Science Diplomacy Leadership Workshop in June, 2018 to connect, learn, and engage.

REPRODUCED WITH PERMISSION FROM DR. MARGA GUAL SOLER.

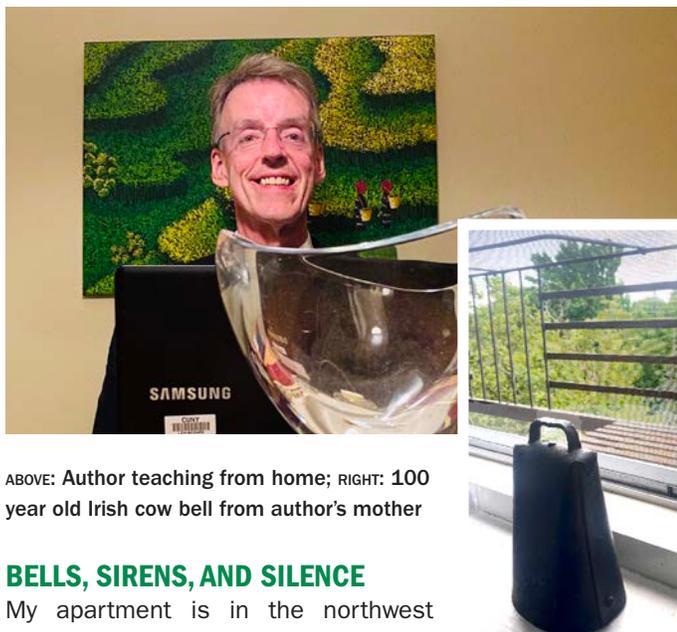
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# Reports from the COVID Epicenter

By Edward Kennelly, PhD

**O**n January 21, my niece and I stepped off our flight from China at John F. Kennedy airport, with no health screening or inquiry to where we had been in the mainland, and headed back to my apartment in the Bronx. I was relieved to have escaped what seemed to be a growing epidemic in China. Only months later did I realize that the situation in my own neighborhood would be magnitudes worse than Wuhan, China, the suspected point of origin of the COVID-19 pandemic. I have lived in New York for over two decades, including the September 11, 2001 terrorist attacks and Hurricane Sandy in 2012, but the impact of coronavirus has been greater in its mortality and length than any other crisis I have lived through before.



ABOVE: Author teaching from home; RIGHT: 100 year old Irish cow bell from author's mother

## BELLS, SIRENS, AND SILENCE

My apartment is in the northwest Bronx, and as I write this in early July, this borough of New York City has endured more coronavirus deaths than anywhere in the world. The Bronx is also the poorest borough of New York City, with about a third of the residents living in poverty, and the majority are people of color. At the start of New York's lockdown in mid-March, I continued to teach at Lehman College online, but many of the undergradu-

ate students in my biochemistry course struggled to get an adequate computer and internet connection for the two-hour lecture and four-hour laboratory. Most of Lehman's students are poor and from the Bronx or lower Westchester County, and some reported having COVID-19 themselves or caring for family members who had the disease. The local hospitals in the Bronx, where many Lehman graduates work, were over capacity by the height of the pandemic in April. Montefiore Hospital nearby Lehman was a designated COVID-19 center and treated over 5,000 patients with the disease by early May.

I myself live within a half mile of three major nursing homes, and these facilities in New York were hit especially hard with COVID-19. As of July there have been 211 deaths in my zip code, and 17.5% people tested positive for the coronavirus. Although I am accustomed to city noises drifting up to my 7<sup>th</sup> floor apartment, the utter silence of my neighborhood in March and April was punctured routinely by the high-pitched sound of ambulances going through the deserted streets. I live below an airplane flight path, and not hearing the occasional distant jet roar was strange, and the April 28 flyover directly above my building by the Blue Angels and Thunderbirds was unexpectedly emotional. At 7:00 pm each night beginning at the start of the lockdown in March, my neighbors would cheer, yell, and bang pots in a show of support for healthcare workers, and also as a symbolic message of letting our neighbors know we are still alive. I joined in with a cow bell that my mother brought back from her mother's farm in County Kerry, Ireland; ringing this hundred-year-old bell made me think of how former generations have survived hardships and later flourished.

## CHINA LESSONS

In the past decade, I have collaborated with researchers in China, especially Minzu University of China in Beijing and Chinese University of Hong Kong (CUHK). As fears of a pandemic began to grow in February, I turned to many of the best practices I had observed throughout my time in China, especially in Hong Kong that weathered the SARS outbreak in 2003 that eventually killed over half a million people worldwide. My collaborator at CUHK had told me of the dark days of SARS where people would avoid getting near each other in public as

*continued on page 27*

**At 7:00 pm each night ...my neighbors would cheer, yell, and bang pots in a show of support for healthcare workers, and also as a symbolic message of letting our neighbors know we are still alive. I joined in with a cow bell that my mother brought back from her mother's farm in County Kerry, Ireland; ringing this hundred-year-old bell made me think of how former generations have survived hardships and later flourished.**

## Reports from the COVID Epicenter



Minzu University summer 2019 medical botany class taught by author.

Students had many suggestions for, <https://ods.od.nih.gov/About/StrategicPlan2017-2021.aspx#2019> him on how to survive the pandemic.

*continued from page 26*

they walked in the usually overcrowded streets of Hong Kong. Little did I realize this practice of social distancing would be common place in New York and throughout the US and world. Like post-September 11, New York has changed in unimaginable ways, and we are now entering into the “new normal” period.



I was surprised and touched to receive two separate shipments of masks from colleagues in Beijing and Hong Kong to my apartment. I was scheduled to go to Hong Kong in mid-March for work, and when I tried to get masks in my local pharmacy in February, there was none to be found. The clear message I got from my Chinese colleagues was to wear a mask; not so much to prevent inhaling the viral particle, but to slow down transmission if I were a carrier. Many Chinese friends urged me to wear a mask, especially on the crowded subways of New York, even before the first case was reported in nearby Westchester on March 9. I wondered whether mask-wearing would ever be culturally acceptable in the United States, and now New York state requires mask wearing in the city in situations where social distancing is not possible. As I walk the streets of the Bronx and go for my morning runs, I cover my face, and most of my neighbors do likewise. I am truly amazed how quickly cultural norms can change in the face of a pandemic.

In the midst of the pandemic, I was curious how my summer students at Minzu University kept their spirits up during their extended stay at home, since they were about six weeks ahead of me in their lockdown. Many had taken up cooking, including



Author running along the Hudson River with mandated facial covering; Minzu student spent his quarantine learning Hit the Woah dance.

special foods from their hometowns like an Inner Mongolian soup made with *Artemisia integrifolia*. One told me he learned “hit the woah,” a dance move that originated in Texas in 2017. Another spent time reading the 2002 book *Globalization and Its Discontents* by Nobel Prize winning author Joseph Stiglitz. Others read less weighty books, and one wrote her autobiography at the age of 20. As for me, I met twice weekly with a lecturer at Minzu University and my vegan Beijing fitness coach to do body weight exercises in my living room at 7:00 am to stave off the “Quarantine 15.”

*continued on page 28*

# Reports from the COVID Epicenter

continued from page 27

## A LITTLE HELP FROM ASP COLLEAGUES

I often tell my students that one of the best benefits of joining ASP and other scientific organizations is getting to know colleagues who you can turn to for scientific and professional development. The pandemic has reinforced this on many levels. In my spring 2020 semester graduate phytochemistry course, we had studied quinine and artemisinin for the treatment of malaria in February. In March, one of my students, Luis, asked me what I could tell the class about President Trump's recommendation about using hydroxychloroquine for the treatment of COVID-19, and he sent me a 2020 paper from the *International Journal of Antimicrobial Agents* to consider. I happened to be in touch with Dr. Dave Newman for an *ASP Newsletter* article, and he immediately agreed to be a guest lecturer in my phytochemistry class to discuss the paper, and Luis acted as the host. Dave provided a wonderful background on drug development for the treatment of COVID-19, the weaknesses with the clinical trial mentioned in the paper, and many other insights from his years of experience in drug development. My students and I were very grateful for this opportunity to interact with Dave.

ASP member Dr. Brian Murphy wrote to me in early June after the killing of George Floyd and asked how the *ASP Newsletter* could be drawn into the conversation about racism that was just starting to occur around the nation. Brian's commitment to issues of diversity and inclusion have been evident to me for some time, especially after he wrote a thought-provoking article for the Winter 2018 *ASP Newsletter*. I was glad that he approached me, and ultimately in the summer issue, we have added a number of additional articles on racism. In the course of this conversation, I have reached out to a number of Black ASP members, and I have really valued their input and suggestions, especially Drs. Phil Crews, Lesley-Ann Giddings, Lenny McDonald, and Patrick Still. I feel fortunate as a member of ASP and editor of this newsletter to know so many outstanding and diverse scientists who are willing to engage me in conversations. I know I have grown as a person from these discourses, and I hope it has helped make me a better editor as well.

In my day-to-day quarantined life, I have turned to ASP colleagues and friends for all sorts of advice and other interactions. In my video chats with Dr. Roy Okuda, he warned me about the website Chegg and how students

have been using it for cheating. His tremendous experience teaching organic chemistry for decades at San Jose State University has been useful for me in the past, and even more so during the pandemic. Dr. Nam-Cheol Kim and his wife helped teach me how to make sweet pumpkin Korean pancakes from a boxed mix I bought a while back in Koreatown, but only during the pandemic did I find time to actually make them. They also filled me in on some great Korean series on Netflix, like *Itaewon Class*.

Older people are at a higher risk for COVID-19, and a number of friends and colleagues in ASP are in that category. I reached out to a few members, and at this moment I fortunately do not know of any who have succumbed to the disease. I did hold in my heart the late ASP Fellow, Dr. Koji Nakanishi, who died last year; a tribute to his life and career was scheduled to take place in April at Columbia University but had to be cancelled due to the pandemic. The last time I visited Koji was in 2019 for Japanese takeout, organized by Drs. Roy Okuda and Nina Berova, at his home in the Isabella Geriatric Center in upper Manhattan, where nearly 100 people have now died of COVID-19; Koji would have been at extreme risk if he were there.



## CURRENT THOUGHTS

As New York reached the apex of our pandemic curve in mid-April, we are now tailing down from a shocking 800 plus COVID-19 deaths in a day to 10 as I write this column before the July 4<sup>th</sup> holiday weekend. I hear of COVID-19 spikes in other parts of the country, and I hope that no other city will see the number of deaths that New York has as it caused a tremendous loss of life, inordinate strains on our health care system, and emotional pressure on all of its residents. I hope a new normal will eventually come to pass. After September 11, 2001, a new normal of heightened security and fear emerged but is not as drastic as it once was. I hope the new normal brought about from COVID-19 will provide us with ways to improve the city, while still remaining safe. I hope, indeed, to be able to meet my ASP friends again in person soon. ■

Dr. Nam-Cheol Kim and his wife helped teach me how to make sweet pumpkin Korean pancakes from a boxed mix I bought a while back in Koreatown, but only during the pandemic did I find time to actually make them. They also filled me in on some great Korean series on Netflix, like *Itaewon Class*.

# ASP PREMIERES NEW LOGO



## American Society of Pharmacognosy

*Above, the new American Society of Pharmacognosy logo.*

The ASP Executive Committee voted unanimously for one logo designed by Ms. Xuehua Cai, and to award Ms. Cai an honorarium of \$1000 for her effort.

By Barry O'Keefe, PhD

Last year I wrote an article for this newsletter letting ASP members know about a plan to redesign the ASP logo. It is my happy duty today to let everyone know the result of that effort. First let me thank the other members of the ASP Logo Committee, Nick Oberlies, Amy Keller, Chris Thornburg and an *ex officio* member, my brother Kelly O'Keefe. All of the members put significant time and effort into deciding on the winning design, and several traveled to New York at their own expense to meet with the designers.

Most importantly, the ASP owes a debt of gratitude to the New York logo design firm of Chermayeff & Geismar & Haviv who agreed to take on the ASP logo redesign project *pro bono*. Sagi Haviv and Tom Geismar were personally involved in every stage of the project and were ably assisted by Marilee Scott and Mika Owens. Finally, the ASP also wants to especially thank the art students of the New York School of Visual Arts (SVA NYC) who are all amazingly talented, and each brought forth beautiful designs for a new ASP logo.

The process for the new logo started with presentations by each of the ASP Logo Committee members to Haviv, Geismar, and the students from the Logo Design Senior Thesis Class at SVA NYC. This included discussions about what the ASP meant to them and what they viewed as important characteristics of the Society now and in the future. This was followed by semester-long design, revision and redesign by all the students under the supervision of Chermayeff & Geismar & Haviv. At the end of the semester, the Logo Committee traveled to NYC for a viewing of all the candidate logos. The students had prepared more than 40 different logos, which were culled down to 18 by Haviv, Geismar, and the students themselves; they were then presented to the committee. The committee and members of Chermayeff & Geismar & Haviv then selected the top six logos from that group. After a few more weeks of considerations and discussions, two logos were chosen as the finalists and were presented for consideration to the ASP Executive Committee by Sagi Haviv.

The design is more modern and abstract than the previous ASP logo. It incorporates two colors to infer the continuum of land-to-sea in which ASP members work. One significant difference from our previous ASP logo, which all of the designers

changed in all 18 designs presented, was the inclusion of the full name "American Society of Pharmacognosy." This was for design reasons but also to bring greater visibility to the actual name of our Society. It turns out there are more than 80 organizations with the initials ASP, each with different logos that include the same abbreviated name. There will only be one logo with our new design and name. Overall, we believe the more abstract design of the new logo is better suited to the wide array of disciplines encompassed by members of our society. As Haviv explained, logos are about identity, they have a unique role and should be immediately identifiable. I believe our new logo is easily identifiable and different from the logos of other scientific societies. It is for us, as ASP members, to provide the meaning to that identity.

To complete the efforts by the Logo Committee, the ASP undertook a legal evaluation of our logo to ensure it did not infringe on other logos. After successfully overcoming that hurdle, the ASP Executive Committee voted to legally trademark the new logo (something we have never done before) to guarantee that it is protected.

You may have already started to see our new logo appearing in forums such as the ASP webinar series and as the icon if you bookmark the ASP webpage. Now that the trademark is fully legally protected we will be more broadly utilizing it for all American Society of Pharmacognosy venues. The *Newsletter*, webpage and ASP letterhead are all in the process of redesign, and, from what I understand, a new cover design for the *Journal of Natural Products* is also in the works.

This logo will be the third in the history of the American Society of Pharmacognosy. We hope that you like it. I myself find that I like it more and more over time. Our friends at Chermayeff & Geismar & Haviv believe strongly that this particular logo is exceptionally well designed. As they have previously designed many iconic logos (including those for PBS, the National Park Service, the Library of Congress, Harvard University Press, the Smithsonian Institution and National Geographic), it is clear they certainly have good judgement. I believe that we have found a new logo that will serve the American Society of Pharmacognosy well for years to come. ■

# Creating a Memorable Logo



## American Society of Pharmacognosy

By Sagi Haviv, BFA

**Editor's Note:** Mr. Sagi Haviv is a partner and principal designer with Chermayeff & Geismar & Haviv. He led the team of students at New York City's School of Visual Arts that created the new ASP logo.

The new visual identity, or logo, for the American Society of Pharmacognosy was designed by Xuehua Cai, a student at the School of Visual Arts, as part of our seminar on Corporate Identity Design. The practical experience of designing a mark that can successfully identify a real-world client—of refining designs from a concept sketched out on a piece of tracing paper, of finding the simplest possible expression of an appropriate visual idea—is one of the most exciting exercises for our students.

A logo, or visual identity, has a different function than a lot of the design we see around us every day. A logo has to identify an organization and its communications quickly, easily, and consistently. You never want to have to change a logo because the goal is for it to gain meaning and power over time.

Looking at a new visual identity design for the first time can be disconcerting; it can even feel absurd. It is only after a mark is officially adopted that the public will embrace it and with time come to associate it with their feelings about the organization it represents. In order to gauge whether a logo will go the distance, you need to assess its functionality.

An effective visual identity solution is about what works. Is it appropriate? Is it simple? Is it memorable? Adherence to these criteria can produce marks that have the potential to endure: they are rele-

vant to the client and can be used flexibly and consistently, so they do not need to be changed in the foreseeable future. They can be simple enough to read in an instant and memorable enough to persist in one's mind.

By appropriate we mean that the trademark is relevant in form and concept to the client and its field or industry. More often than not, a trademark cannot express a great deal in detail; instead, a successful trademark is like a vessel that can hold the associations relevant to the company or organization rather than actually illustrate them.

By simple we mean that a trademark has to be focused in concept—have a single “story”—and, in most cases, must be uncomplicated in form. This is so it can work effectively and flexibly in a wide range of sizes and media: in small size on a business card, in different physical materials such as those used for signage, and in pixels in the digital realm, even as a website browser icon.

By memorable we mean that while the form must be simple, it must also be distinctive, unusual enough to be remembered. Of course, the simpler the form is the less special it tends to become. In other words, how memorable can the design be while remaining simple? How distinctive can we make the mark while keeping it focused? You can sometimes tell that the right balance has been struck when, after a brief time of looking at a mark, you can easily draw it from memory.

We are immensely pleased with Xuehua's solution and delighted to see it out in the broader world. ■



LEFT ABOVE: Sagi Haviv, BELOW: Xuehua Cai



# American Society of Pharmacognosy

## ASP Votes: Results Are In!

*By Amy Keller, PhD*

**T**he ASP membership has elected four new officers. Dr. Kerry McPhail will serve as vice president (a one-year term, followed by a one-year presidency), Dr. Marcy Balunas will serve on the EC (a four-year term), Dr. Ben Naman will be our Younger Member Executive Committee member (a two-year term), and Dr. Amy Keller was elected to serve as the secretary (a five-year term). There were no other items on the ballot.

The election was open from April 30 to June 11, 2020. In total, 51.9% of the ASP membership voted in this election, the highest participation rate in over a decade. Thanks to all of the candidates, and all who voted. Best wishes to all the new officers for a great term of service. ■



LEFT TO RIGHT: Dr. Kerry McPhail, Dr. Marcy Balunas, Dr. Ben Naman, Dr. Amy Keller

PHOTOS: DANIEL SEEMILLER, PETER MORENUS/UCONN, KEVIN TARSON, LESLIE KNAUB

# In Memoriam: Arnold Demain

By Sheo B. Singh, PhD; Vincent Gullo, PhD; Neal Connors, PhD

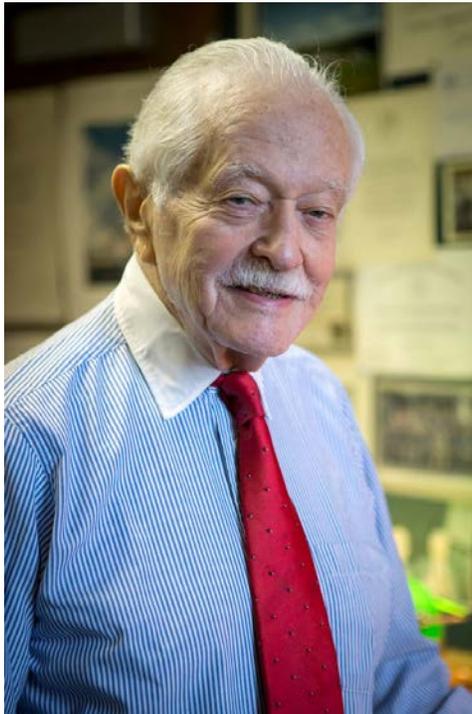
Professor Arnold Lester Demain, an eminent industrial microbiologist and fermentation scientist as well as a pioneering figure in the field of antibiotics and microbial secondary metabolites, passed away on April 3, 2020 at the age of 92 from complications of COVID-19.

Dr. Demain was founder and former head of fermentation microbiology at Merck, professor of biology at the Massachusetts Institute of Technology, and RISE Research Fellow at Drew University. He conducted groundbreaking research on fermentation microbiology and technology and applied his research to the development of natural antibiotics while mentoring hundreds of young scientists that were part of “Army’s Army.”

Demain advanced the field of fermentation microbiology and made seminal contributions in the biosynthesis and production of beta-lactam antibiotics: penicillins and cephalosporins. He became one of the most prolific and leading industrial microbiologists in the world with a career spanning sixty years. Most importantly, he is highly recognized for his mentorship of hundreds of young scientists from around the world who studied under him.

He was born on April 26, 1927 in Brooklyn, New York, to Henry Demain and Gussie (Katz) Demain. Demain graduated from high school at 16 and entered Michigan State College (now Michigan State University). At 17, he paused his education to join the US Navy to fight in World War II, serving in the Hospital Corps. After the war ended, he returned to Michigan and completed his bachelor’s degree in 1949 and master’s in microbiology in 1950. His master’s studies focused on food fermentation, specifically investigating pickle spoilage. It was during this time he met and married Joanna (Jody) Demain on August 2, 1952.

Demain started his PhD program in food science at the University of California, Berkeley, under the tutelage of Professor Herman Jan Phaff, a prominent yeast scholar, and relocated to



Dr. Arnold Lester Demain

Davis with him after the opening of a new campus. His PhD thesis research investigated the degradation of pectic acid by an extracellular enzyme in the yeast, *Klyveromyces fragilis*. This work led to four publications including one in *Nature*. Demain, along with Phaff, were among the first to perform affinity chromatography, which is significant as it is a standard biochemical procedure that remains in use today.

After completing his PhD in 1954, he was recruited by Merck & Co., Inc. to study the biosynthesis of penicillin and cephalosporin C. He rapidly made key discoveries that unlocked the biosynthesis of penicillin allowing for the discovery of semisynthetic penicillins, lifesaving antibiotics. His findings were remarkably innovative in the field of microbial fermentation. By identifying key intermediates in penicillin biosynthesis, improving process design and execution, very high titers of natural penicillin were achieved. Remarkably this process is still used today. As a

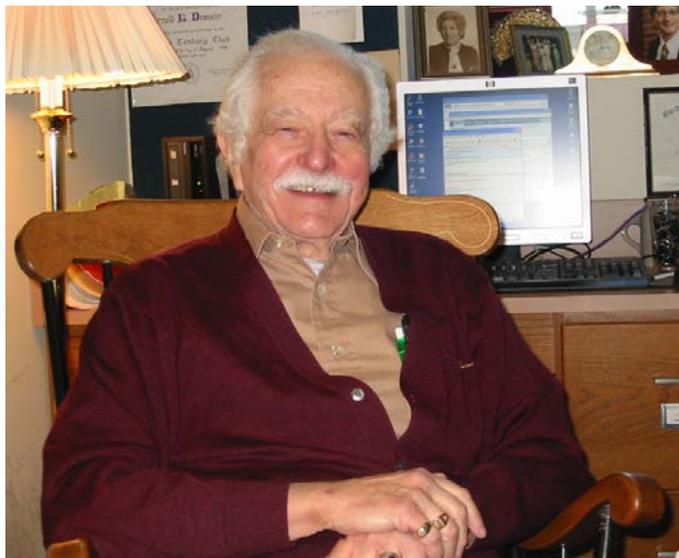
result of these rapid, outstanding contributions and Demain’s exceptional scientific talent, Merck asked him, in 1965, to start and lead a new fermentation microbiology department in Rahway that remained intact for more than 35 years.

In 1969, after 15 years and tremendous success leading fermentation microbiology at Merck, Demain was recruited as a full professor of industrial microbiology by MIT, joining the Department of Nutrition and Food Science. He became a member of the Department of Biology in 1988 after a merger of the departments. He was the first professor at MIT to conduct research on antibiotics. He continued investigating penicillins and cephalosporins, culminating in many breakthrough discoveries including the discovery of a novel key enzyme in cephalosporin biosynthesis, deacetoxycephalosporin C synthase (“expandase”). In the mid-1990s, he directed a series of experiments to probe effects of simulated microgravity on secondary metabolism sponsored by NASA. In late 1990s, he

*continued on page 33*

**He conducted groundbreaking research on fermentation microbiology and technology and applied his research to the development of natural antibiotics while mentoring hundreds of young scientists that were part of “Army’s Army.”**

## In Memoriam: Arnold Demain



Dr. Demain

*continued from page 32*

became interested in studying *Clostridium tetani* and *Clostridium difficile* for potentially developing bacterial vaccines for tetanus and antibiotic-associated diarrhea.

After retirement from MIT, Demain and his wife returned to New Jersey to be near their daughter and grandchildren. He joined the Research Institute for Scientists Emeriti (RISE) at Drew University as a RISE Research Fellow where he continued his research in fermentation microbiology, mentoring undergraduate students. His dedication to his research and his students was remarkable. He arrived at Drew early in the day and often stayed late to work with students, even at a very advanced age. His students have gone on to top professional and graduate schools further cementing his legacy as a mentor of young scientists. He published a number of papers on antibiotics with undergraduates at Drew University until his retirement in 2019 at the age of 92. "I can say with much feeling that Arny Demain was a great man, a great scientist, a great teacher and a great friend. Indeed, he was a friend to countless people, and Arny's Army is just one contingent of the multitude of men and women who will mourn his loss," com-

**Demain advanced the field of fermentation microbiology and made seminal contributions in the biosynthesis and production of beta-lactam antibiotics: penicillins and cephalosporins.**

mented William Campbell, Nobel Laureate (2015), who knew Arny well both at Merck as well as at Drew.

Demain helped catalyze the biotech industry. He was a founding consultant of Cetus Corporation based in Berkeley, CA in the 1970s and continued consulting for biotech and pharma companies until a few years before his retirement from Drew. While his scientific contributions are many, his greatest legacy may be that of a mentor to young scientists, having created a generation of biotech leaders. An informal group of his students and postdocs formed "Arny's Army and Friends" that held worldwide symposia in his honor every three years since his retirement from MIT at 75.

He published over 500 papers, co-edited or co-authored 14 books and was granted 21 US patents. He was the recipient of numerous honorary doctorates, awards and recognitions from throughout the world including one from the King of Spain and another from the Emperor of Japan. He was a member of the National Academy of Sciences, president of the Society of Industrial Microbiology, and on the Board of Governors for the American Academy of Microbiology. He travelled around the world lecturing at meetings and universities where he imparted his vision to everyone. Additional information of his career can be found on his Wikipedia page: [www.en.wikipedia.org/wiki/Arnold\\_Demain](http://www.en.wikipedia.org/wiki/Arnold_Demain).

He had a great life. He is survived by his wife of 68 years, Joanna (Jody) Demain; his daughter, Pamela Demain; his son, Jeffrey Demain; and his grandchildren as well as his great-grandchildren. ■

**He became one of the most prolific and leading industrial microbiologists in the world with a career spanning sixty years. Most importantly, he is highly recognized for his mentorship of hundreds of young scientists from around the world who studied under him.**



# The NIH-ODS Releases 2019 Annual Report

By Joseph Betz, PhD



Each year the Office of Dietary Supplements (ODS) at the National Institutes of Health (NIH) produces an annual report to track its accomplishments and responsiveness to emerging public health issues and provide transparency for the ODS stakeholder community. The public is encouraged to review the 2019 [annual report, www.ods.od.nih.gov/About/StrategicPlan2017-2021.aspx#2019](http://www.ods.od.nih.gov/About/StrategicPlan2017-2021.aspx#2019), to learn about ODS's latest program accomplishments and the many ways ODS continues to fulfill its mission.

ODS was created in 1995 at a time of high public and congressional interest in health maintenance and wellness, in particular the concept that nutrients and other natural substances, such as botanicals provided as dietary supplements, might offer benefits to health beyond basic nutrition. The mission of ODS has been to strengthen knowledge and understanding of dietary supplements by evaluating scientific information, stimulating and supporting research, disseminating research results, and educating the public to foster an enhanced quality of life and health for the US population.

In addition to the original purpose and duties prescribed in the 1994 Dietary Supplement Health and Education Act (DSHEA), over the years Congress has mandated that ODS take on additional specific programs including: a botanical research center program (Centers for Advancing Research on Botanical and Other Natural Products [CARBON]) (1999); evidence-based reviews of the efficacy and safety of dietary supplements (2001); a dietary supplement analytical methods and reference materials program (AMRM) (2001); and a dietary supplement label database (DSLDD) (2003).

In response to its legislative mandates, ODS developed a series of five-year strategic plans. The most recent has four main goals: 1) expand the scientific knowledge base on dietary supplements by stimulating and supporting biomedical research and by developing and contributing to relevant initiatives, workshops, meetings, and conferences; 2) enhance the dietary supplement research workforce through training and career development; 3) foster development and dissemination of research resources and tools to enhance the quality of di-

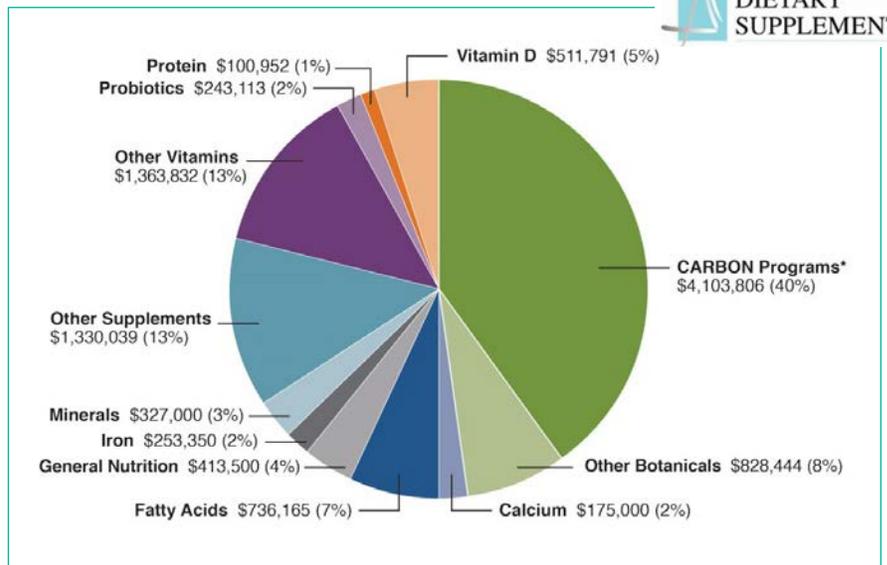


Figure 1. ODS Co-Funded Grants in FY2019 by Research Area (59 grants valued at \$10.4M across 13 NIH ICs)

etary supplement research; and 4) translate dietary supplement research findings into useful information for consumers, health professionals, researchers, and policymakers.

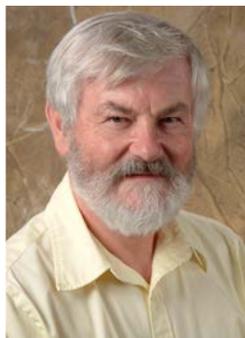
As the lead federal entity addressing the scientific exploration of dietary supplements, ODS continues to advance the research agenda and knowledge base as a facilitator of research, developer of resources, trainer of researchers, collaborator with academics and federal and other agencies, and communicator of existing and new knowledge. Because it is a small programmatic office within the NIH Office of the Director, ODS cannot fund grants directly. Instead, the Office works with other NIH Institutes and Centers (ICs) to co-fund grants. This process can occur in several ways. Individual ICs can identify applications in which ODS may have a programmatic interest and contact the Office directly for co-funding. The ODS has also published Funding Opportunity Announcements (FOA) intended for investigators who already have NIH grants. In 2019, ODS worked with 13 Institutes and Centers within NIH and contributed \$10.4 million for research into dietary supplements and their possible roles in maintaining health and preventing chronic disease (Figure 1). ■

**The mission of ODS has been to strengthen knowledge and understanding of dietary supplements by evaluating scientific information, stimulating and supporting research, disseminating research results, and educating the public to foster an enhanced quality of life and health for the US population.**



# HOT TOPICS IN PHARMACOLOGY

Recent “Ramblings” through the *Journal of Medicinal Chemistry*



By David Newman, DPhil

The *JMC* not often is consulted for information on natural products and/or derivatives, but very recently there have been papers that are definitely of interest to natural product chemists and pharmacologists and perhaps pharmacognosists in this modern world!

## REENGINEERING OF VINCAMINE INTO AN OPIOID ANTAGONIST

A paper from the University of Florida's CNPD3 group, with the major author being Huigens, together with a significant number of colleagues from the same grouping,<sup>1</sup> demonstrated that starting with vincamine (**1**) they could produce a number of ring-modified bioactive candidates with multiple bioactivities. Vincamine itself is both a prescription medication in some countries and approved as a food supplement in the USA; though a derivative, vinpocetine (**2**) was not approved as a food supplement by the FDA in 2019. By some very clever ring modifications, this group was able to synthesize multiple compounds based upon the vincamine skeleton, including a compound they named as V2a (**3**). This compound, together with many other derivatives produced by different chemistries that gave multiple variations on the base vincamine structure, was tested against a panel of 168 GPCR targets in cell-based assays and led to the identification of compound **3** using both vincamine and yohimbine as comparators. Compound **3** was antagonistic against the hypocretin (orexin) receptor 2. Antagonism of this receptor was recently reported as being involved in the reduction of heroin self-administration in rats. A forced swim test in suitably treated mice led to the conclusion that this compound had potential as a lead to reduction of opiate usage by blockade of HCRTR2. In addition, docking models using the PDB data for HCRTR2 showed excellent binding, so this structure may well be a good lead for rationally designing agents against opioid abuse.

Thus, starting from what is effectively an inert natural product, a potential compound lead to an opiate antagonist was developed, and it had both *in vitro* and *in vivo* relevant pharmacological activities.

## MODIFICATION OF ECHINOMYCIN TO GIVE UNNATURAL DEPSIPEPTIDES AS HIF-1 INHIBITORS WITH ANTITUMOR POTENTIAL

The Nagasawa group at Gifu University, together with collaborators from the University of Tokyo, published a paper in early 2020 that is a “tour de force” in terms of modifying the bicyclic microbial product echinomycin (**4**) to give the quinoline derivative (**5**).<sup>2</sup> In this study, the quinoxaline “ends” of echinomycin have been replaced by 3-hydroxy-quinolines, and the bridging group has been radically changed from a thioether in the echinomycin or a dithiol in the case of the close relatives of the triostin series to the **Z** alkene in compound 12 (**5**).

On evaluating the relative antitumor activities of the parent and the modified depsipeptides, then their relative bioactivities (IC<sub>50</sub> values for the MCF-7 cell line) were 2.0 nM for echinomycin versus 0.22 nM for compound **5**, and their HIF-1 inhibitory figures (nM) were 0.35 for echinomycin versus 0.09 for compound **5**. In addition to these significantly increased bioactivities, the molecule was metabolically stable compared to the parent thioether (or the disulfide in the triostin variant). In particular its HIF-1 activity level places this molecule amongst the most potent inhibitors of this protein so far reported. In addition, and it may be a significant finding in the future development of this compound, the unnatural **Z**-alkene bridge was stable for at least 24 hours in the serum-containing cell culture medium.

## CONVERSION OF THE CATIONIC TACHYPLESIN 1 TO AN IMPROVED ALL-D-AMINO ACID FORM WITH IMPROVED ACTIVITIES AGAINST MULTI-DRUG RESISTANT BACTERIA

A group from mainly marine-associated universities in the PRC, working with the Craik group in the IMB at the University of Queensland in Brisbane, recently published<sup>3</sup> the synthesis and biological activities of the all-*D*-form of TP 1 (TPAD). The original compound is a cationic  $\beta$ -hairpin antimicrobial peptide present in the lymphocyte granulosa cells of the horseshoe crab, and it was first isolated from hepatocytes of the animal.

The all-*D*-17-mer peptide that was synthesized by the group had one replacement in the chain, where Leu replaced Ile in position 11 due to the cost of the corresponding *D*-Ile but the overall physico-chemical properties stayed the same. The two disulfide bridges stayed in the same locations as in the native form (**6**).

On investigating the antibacterial activities against members of the ESKAPE pathogen series, and using colistin (the current antibiotic of last resort) as a standard, TP 1 and TPAD had good

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## HOT TOPICS IN PHARMACOGNOSY: Recent “Ramblings” through the *Journal of Medicinal Chemistry*

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activities against Gram positive organisms but lacked significant activity against Gram negative microbes and were superior to colistin against specific *S. aureus* strains that were part of the ESKAPE series. In addition, the minimum bactericidal concentrations were similar for both TP 1 and TPAD. In addition, TPAD had comparable hemolytic activities to TP 1 up to approximately a 35% level at 100  $\mu\text{g}\cdot\text{ml}^{-1}$  where it plateaued, whereas the parent continued to approximately 80% at the 500  $\mu\text{g}\cdot\text{ml}^{-1}$  level.

Using a *Lysobacter* model, the resistance to both the natural and the modified antibiotics is due to the activation of the QseC/B two component system, and, using the known inhibitor of this complex (LED209; **7**), significant activity was seen using the combination of 2  $\mu\text{g}\cdot\text{ml}^{-1}$  of TPAD and 5 pM LED209, which gave a very significant reduction in bacterial load for both *Pseudoalteromonas antarctica* and *Stenotrophomonas maltophilia* (3-3.5 logs reduction at this concentration) for these resistant microbes. Although the target(s) for TPAD are currently unknown, further work on this class of molecules is definitely worth pursuing.

### A NOVEL LIPOPEPTIDE, STALOBACIN, FROM AN AS YET UNIDENTIFIED MICROBE.

A group from the well-known Japanese company Shionogi have just published a very interesting paper<sup>4</sup> demonstrating a totally novel lipopeptide antibiotic (stalobacin, **8**) from an as yet unidentifiable organism, that not only has an unusual structure but also contains a previously unreported isomer of the unusual amino acid carnosadine (**9**) as a cyclic lactam (*cf* top right-hand corner of structure **8**). This amino acid can be considered a surrogate for arginine.

Two unusual aspects of this report were: the inability to identify the producing microbe in spite of trying to identify via 16S rRNA analyses; and the original report of this agent was in a 1995 patent published in August of that year (W)1995023812), but it was not until recently that its excellent activity against multiply resistant Gram positive and Gram negative bacteria was formally reported.

As examples of the potency of this antibiotic, the following are the MICs in  $\mu\text{g}\cdot\text{ml}^{-1}$  for four resistant microbes that are part of the ESKAPE series: *S. aureus* SR3637 (MRSA) 0.008; *E. faecalis* SR7914 (Van A) 0.016; *E. faecium* SR7940 (Van A), 0.004; and *S. pneumoniae* SR11031 (PRSP) < 0.004. Thus, all are nanogram active in *in vitro* assays.

In addition, there was an unusual phenomenon that was noticed in both Gram positive and negative bacteria treated with this antibiotic, in that a characteristic morphology change occurred where the bacteria effectively “inflated.” This was quite different from what is seen when  $\beta$ -lactams are the antibiotic. It was also difficult to obtain a “stable” stalobacin-resistant phenotype, irrespective of whether the test organism was Gram positive or negative. These observations imply, but do not prove, that the target(s) might be common to both “types” of bacteria.

Though the level of production of this antibiotic was low in the report, where up to 250 L fermentations were used, the Shionogi Company is very experienced in fermentative production of antibiotics, so it will be interesting to see where this class of antibiotics progresses in the near future as the need for such potent antibiotics is well established. ■

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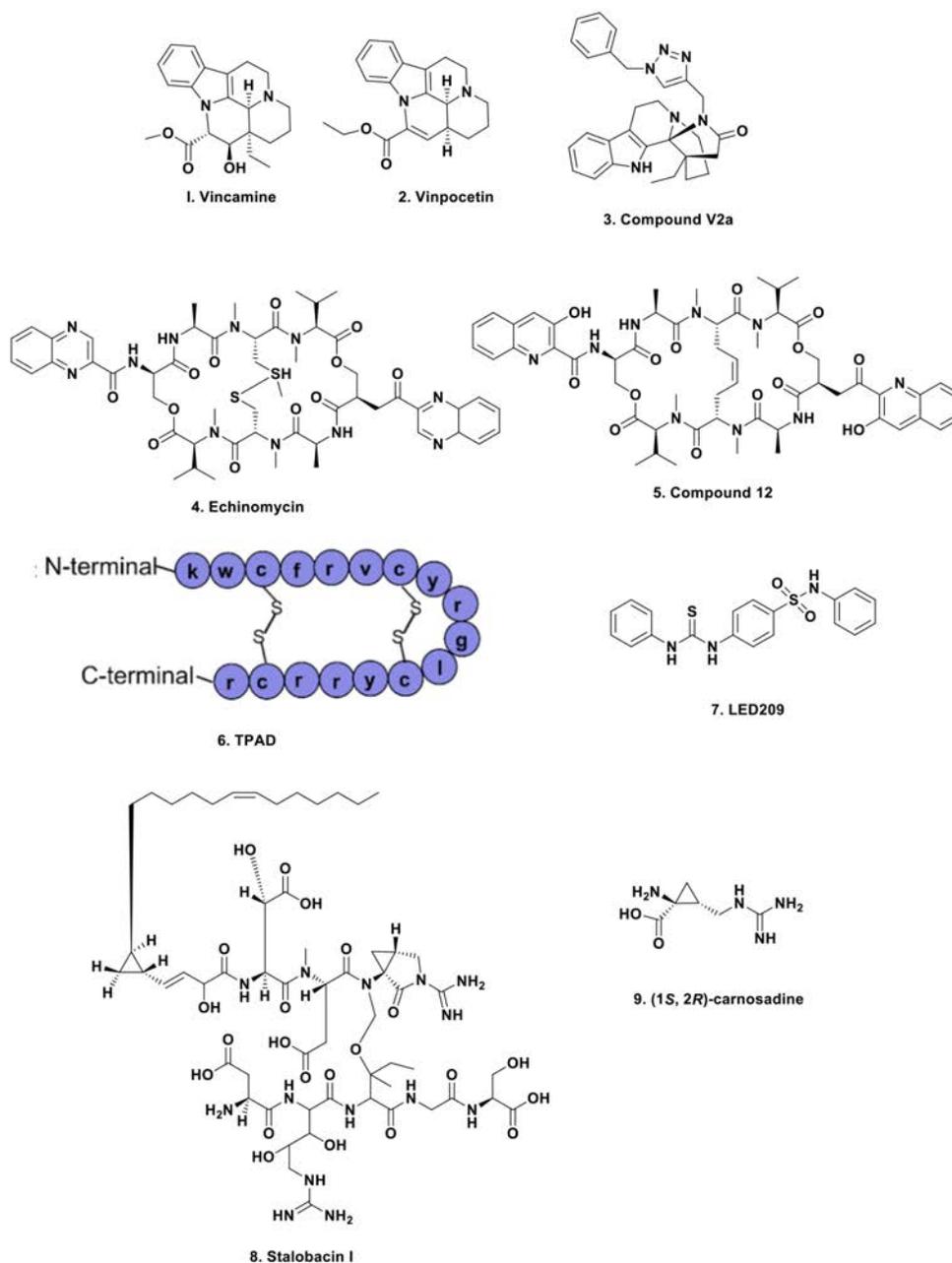
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# HOT TOPICS IN PHARMACOGENOSY: Recent “Ramblings” through the *Journal of Medicinal Chemistry*

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## Structures





# Behind the Scenes in Pharmacognosy

## Phthalideisoquinoline Hemiacetal Alkaloids

By Andrea Rague, BS

In late 2019, the *Journal of Natural Products* published an article entitled “Phthalideisoquinoline Hemiacetal Alkaloids from *Corydalis decumbens* That Inhibit Spontaneous Calcium Oscillations, Including Alkyl Derivatives of (+)-Egenine That Are Strikingly Levorotatory,” authored by Dr. Chunlei Zhang, ASP member Dr. C. Benjamin Naman, and others. We thank Dr. Naman for taking some of his time to share this work and insights with ASP members. Please read the full article in *J. Nat. Prod.* 2019, DOI: 10.1021/acs.jnatprod.9b00247.

### How did you become interested in *Corydalis decumbens* and its neurologically active phytochemicals?

This plant material is being actively used in traditional Chinese medicine (TCM) and appears to have some neuromodulation efficacy in human patients. My attention was called to this by my colleague Zhengyu Cao, who is also a corresponding author for the paper. Zhengyu is a neuropharmacologist who I have been collaborating with for some time now on various projects, and our interactions have opened new directions for research in both of our labs. Alkaloids, perhaps unsurprisingly, appear to be major neuroactive components of this TCM ingredient,



Some of the contributing authors of this work. From left to right: C.B. Naman, C. Zhang, Z. Cao

and our investigation of these constituents led us down an interesting path.

### Who in your lab carried out the research?

The majority of the work was carried out by the first author on the paper, Chunlei Zhang, a postdoctoral research scientist in Professor Zhengyu Cao's lab. Chunlei, Zhengyu, and I worked together closely on this project, and we also included Haixiao Jin from my side of the collaboration as well as some students and technicians from Zhengyu's group. We each approached the research question from different scientific perspectives, and it was this group thinking that ultimately made the work a success.

### Could you provide a brief explanation of the work and results in your own words?

This study began as a deeper dive into a plant material that was already worked on in Zhengyu's lab (*Phytochemistry* 2018, 150, 85–92). In short, we believed that another unreported set of phytochemicals was present that could help explain the use of this plant material in TCM and the demonstrated *in vitro* ion channel modulatory activity of the organic extract. When we analyzed the physical data obtained for some new, structurally-related, active isolates, though, the elucidation of planar structures was fairly straightforward while the determination of absolute configuration was not so. This may seem unsurprising at first, but characterized analogues do exist in the literature, and we recognized an interesting phenomenon in stereochemistry when comparing physical data within our sample set and those reported values in the series of published analogues.

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In the Naman Lab, accomplishments and milestones are celebrated by enjoying food together.

PHOTO CREDIT: C. BENJAMIN NAMAN



# Behind the Scenes in Pharmacognosy: Phthalideisoquinoline Hemiacetal Alkaloids

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**In this study, you demonstrate that comparing coupling constants and optical rotation alone may not always be enough to correctly assign absolute configuration. How did you arrive at this conclusion with the isolated phthalideisoquinoline hemiacetal alkaloids, and what experiments were instrumental in confirming this?**

The truth is, we went through quite a lot to come to this seemingly basic fundamental conclusion. Reported in the paper are experiments that include calculation of electronic circular dichroism (ECD) values at different wavelengths so that we could compare actual and computational spectra, facile total synthesis by chemical derivatization of what appears to be the natural precursor molecule for some isolated analogues to confirm the interrelationships, and even X-ray crystallography to conclusively assign configuration. What we did not write up was the repeated checking and remeasurement of data, questioning and confirmation of sample labels, attempts to contact authors of previously published papers on reported analogue compounds, and a great deal of time thinking about the possibility of epimerization and other alternative hypotheses. Finally we accepted that our observation that the sign of optical rotation and Cotton effects in ECD, as well as the magnitude of  $^3J_{\text{H,H}}$  constants, was not primarily dependent on the configuration of the key stereocenters in these molecules. Then we got to work on explaining why.

**What impact does this research have on natural product science?**

On the one hand, the outcome of this research highlights the importance of explaining data in terms of basic principles and not only relying on published values for comparison. In some more expansive and better defined compound families such as flavonoids, this might not be such a problem as it is with a relatively rare subclass like the phthalideisoquinoline hemiacetal alkaloids. On the other hand, I am reminded that one of my former mentors used to occasionally tell me that, until the structure

of a natural product had been characterized by X-ray crystallography or confirmed by total chemical synthesis, that structure represents the result of data interpretation – and there is room for human and other errors in any form of interpretation. We overcame these hurdles to confirm our suspicions by X-ray crystallography and synthesis, leaving no room for doubt about the planar structure or absolute configuration of the new molecules. I believe that other molecules with the same phenomenon of conformational rather than configurational isomers strongly impacting the optical rotation and ECD exist in published literature, but I have had a hard time thinking of an efficient way to scour what is currently out there to find nebulous data. Hopefully, our work will help to guide other researchers in appropriate directions, whether they are working with structurally-related molecules or come across different atypical phenomena.

**What advice would you give to scientists starting their careers in natural products?**

The first thing to do is to send me an e-mail if you are open to working in China, because the new College of Food and Pharmaceutical Sciences that we founded at Ningbo University in 2018 will still be hiring for the next couple of years and has recently provided an internal funding mechanism for postdocs. Past that I think it is of paramount importance to overcome the urge to move too quickly, because unchecked speed will often lead to mistakes. A misuse of hard-to-come-by material, a small misstep in data analysis and reporting, lacking intellectual property sharing and biodiversity agreements before obtaining sample materials, and even poorly negotiated agreements for collaborations, outsourced services, and instrument purchases can have profound impacts on your career later. If you are a graduate student, this could translate to finding peers and mentors to help double check your data and to act as a sounding board for your ideas before you try them out. I feel fortunate to have had great mentors and colleagues who have

historically traded this favor back and forth with me, and continue to, and I always encourage others to do the same.

**Does your lab have a motto or slogan?**

Our lab motto is “Stronger Together,” and this is often signified with handshake emojis or the image of a sailor’s reef, or square, knot. I think Hillary Clinton must also like our lab motto because she used it as a book title shortly before I started my job and joined the group. I assure you, however, that the motto and the lab itself are both apolitical. “Stronger Together” really came from the Chinese tradition of being a cohesive team in all successes and failures.

**What is your greatest extravagance in the lab?**

We spent a lot of time and energy making the case for the construction of a brand-new, state-of-the-art NMR core facility and purchase of 600 and 800 MHz Bruker spectrometers, digital consoles, cryoprobes, and small volume coils. Now I am often jealous that my students and postdocs get to work hands on with this equipment, and whenever I can I try to convey to them how amazing and special it is. The data we are collecting with these new instruments is truly beautiful!

**How do you celebrate accomplishments in your lab?**

In this regard I have definitely adapted to the Chinese culture, and we celebrate lab member accomplishments and milestones with seriously overfilling feasts. Since the expectation is to order far, far too much to be able to eat in one sitting, the students are encouraged to take leftovers home to enjoy again another day. We also have an ongoing WeChat group message for lab business and other discussions and notifications, and the best days are marked with outpourings of congratulations from me and fellow lab members. I think my students might prefer the Chinese food, though. I guess we will have to wait and see if that can resume in the PC (post-COVID-19) world. ■

# Meet a New ASP Member



## Dr. Alejandra Prieto-Davo

*Dr. Alejandra Prieto-Davo is our featured new member in this issue of the Newsletter. She received her PhD from the Scripps Institution of Oceanography with Professors Bill Fenical and Paul Jensen and then went on to two postdoctoral positions. Since 2011 she has worked at the National Autonomous University of Mexico, Sisal Campus and is now a full professor in the Department of Chemistry studying the metagenomics of marine microbes. We are pleased to be able to officially welcome Dr. Prieto-Davo to ASP!*

By Wendy Strangman, PhD

### What is your scientific background?

I received my undergraduate degree in oceanography at the Autonomous University of Baja California with a focus in the marine chemistry area. During my senior year, I started working with Dr. Irma Soria at UABC, and she introduced me to the wonderful world of marine natural products. I looked for bioactive compounds produced by a sponge of the genus *Geodia*. As part of my undergraduate thesis training she wanted to show me how to do structure elucidation, and she took me to meet a famous scientist who had agreed to have us over to use his HPLC and NMR at the Scripps Institution of Oceanography in La Jolla. And that is where I met Bill Fenical and his lab. I fell in love with the place and the lab instantly! And every time I came over from Ensenada to work in the lab, there happened to be a party because somebody was leaving or because Bill had won an award! So, I thought I really need to find a way to come do my research here. Great place to learn, great people to learn from, and parties all the time. It was just too good to pass up!

I continued my graduate studies in Ensenada and did a Masters in Science in Oceanography, and I asked Bill to be my advisor. I spent those couple of years learning to work with



Dr. Alejandra Prieto-Davo

PHOTO: ALEJANDRA PRIETO-DAVO

marine actinomycetes and learning about their chemical interactions. I graduated with my masters and started my PhD the same year at SIO with Bill after receiving a fellowship from Conacyt. I graduated in 2008 and then stayed in San Diego for three years doing postdoctoral work with Professors Eric Allen at SIO and Forest Rohwer at San Diego State. That is where I guided my research

towards metagenomics and applications in natural products research. I was ready to start a third postdoc in Spain when they contacted me from UNAM and asked me to interview. I came down to Yucatan in hopes of finding a good place to work, and I was very surprised to find it in a little fishing town in Southeast Mexico. From then on, I have mentored several undergraduate and graduate stu-

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**I spent those couple of years learning to work with marine actinomycetes and learning about their chemical interactions.**

## Meet a New ASP Member

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### Our current research focuses on using an interdisciplinary approach to study microbial communities in coastal and cenote sediments.

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dents, and I have established my career in the School of Chemistry. Our current research focuses on using an interdisciplinary approach to study microbial communities in coastal and cenote sediments. Cenotes (“sink holes”) are very characteristic environments where the underground river of the Yucatan peninsula has a connection with the outside through a cave and with the ocean through a saline intrusion. It is usually a very impressive cave, by the way. We use microbiology, metagenomics, genomics, and organic and analytical chemistry to study these communities and their potential in natural product discovery. We have a small collection of over 280 strains from these environments, and we look at their chemical interactions among them and with other microbes (pathogens and fungi). We also recently started a project to take the same approach and look at some sponges we have found in these caves and their microbiomes.

#### **How did you hear about the ASP?**

My colleague from UNAM in Mexico City told me about the 2020 conference in San Francisco and how we should send our abstracts to go present the work we have accomplished over the past couple of years. Unfortunately, the conference was cancelled due to the health crisis, but I am hoping it can be rescheduled for 2021 or 2022.

#### **Why did you decide to join ASP?**

Well, I am also part of a group in marine natural products through Facebook, and there Dr. Sandra Loesgen announced the new natural products webinar series ([www.pharmacognosy.us/natural-product-sciences-webinar/](http://www.pharmacognosy.us/natural-product-sciences-webinar/)). I thought that would be great since I cannot attend many good seminars being in a little fishing town one hour away from the nearest city! Also, I saw many of the presenters were working on similar projects to mine, either different environments or different organisms, but same techniques. So, why not?

#### **What would you like to achieve through your membership?**

I would love if the seminar series continued to be online or at least available to watch if you are not present. Also, I'd like to get more information on what people are up to and the papers that they are writing. It would also be great if there was a journal club section available.

#### **What other scientific societies do you belong to?**

I used to belong to ASM but since my institution does not pay for memberships, I have to choose which ones I pay for. This time I chose ASP.

#### **What do you like doing in your spare time – movies, activities, etc.?**

I travel with my kids to different beaches, and I run a lot. My favorite movie is *The Sound of Music*. I just saw it with my youngest child, and she is a fan now, too. Also, *Back to the Future*. ■

### We use microbiology, metagenomics, genomics, and organic and analytical chemistry to study these communities and their potential in natural product discovery.

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# New Members of ASP Summer 2020

ASP would like to welcome our new members. The Society's main objectives are to provide the opportunity for association among the workers in pharmacognosy and related sciences, to provide opportunities for presentation of research achievements, and to promote the publication of meritorious research. New members include fourteen full members and six associate members. We look forward to meeting you and learning more about you and your work.



## American Society of Pharmacognosy

### FULL MEMBERS

**Prof. Paul Blakemore**  
Oregon State University  
Corvallis, OR  
Professor of Chemistry

**Dr. Manisha Dikshit**  
Uttarakhand Ayurved University  
Haridwar, Uttarakhand, India  
Assistant Professor

**Dr. Rick Gussio**  
National Cancer Institute  
Frederick, MD  
Section Chief

**Dr. Blaise Kimbadi Lombe**  
Technical University Dortmund  
Dortmund, Germany  
Postdoc

**Dr. Rohitash Kumar**  
University of Chemistry and Technology Prague  
Prague, Czech Republic  
Postdoc

**Dr. Ying Liu**  
British Columbia Institute of Technology  
Burnaby, BC, Canada  
Research Associate

**Dr. Monica McCallum**  
Harvard University  
Cambridge, MA  
Postdoctoral Fellow

**Dr. Erin McCauley**  
California State University Dominguez Hills  
Carson, CA  
Assistant Professor

**Dr. Traci Pantuso**  
Bastyr University  
Kenmore, WA  
Faculty and Research Investigator

**Dr. Remington Poulin**  
Friedrich Schiller University Jena  
Jena, Germany  
Postdoctoral Fellow

**Dr. Alejandra Prieto-Davó**  
Universidad Nacional Autónoma de México  
Sisal, Yucatán, México  
Full Professor

**Dr. Guangwei Wu**  
University of Utah  
Salt Lake City, UT  
Postdoc

**Dr. Ryan Young**  
National University of Ireland Galway  
Galway, Ireland  
Postdoctoral Researcher

**Dr. Peng Zhang**  
University of Utah  
Salt Lake City, UT  
Postdoc

### ASSOCIATE MEMBERS

**Ms. Shukria Akbar**  
University of Mississippi  
University, MS  
PhD Candidate

**Ms. Amy Bellinghiere**  
University of California, Davis  
Davis, CA  
Graduate Student

**Ms. Hannah Lusk**  
University of Illinois at Chicago  
Chicago, IL  
Graduate Student

**Mr. Jonathan Parra**  
University of Strathclyde  
Glasgow, Scotland  
PhD Student

**Mr. Arash Samadi**  
Oregon State University  
Corvallis, OR  
Graduate Assistant

**Ms. Ekaterina-Michaela Tomou**  
National and Kapodistrian University of Athens  
Athens, Greece  
PhD Candidate

# Pharmacognosy Field Notes

## Seeking Extremophiles in the Boiling River of the Peruvian Amazon

By Rosa V. Espinoza, PhD Candidate

Lying down against a warm, giant-sized rock, I can feel the unapologetic steam of the river reaching my face. I follow its course towards the sky to realize it is impossible to tell where the steam ends and the clouds begin. The sun set a few hours ago, letting the night come in its full splendor, with our mesmerizing Milky Way capturing everyone's attention.

We are at the heart of the Peruvian Rainforest in a traditional community on the banks of the stunningly unique Boiling River of the Amazon. For centuries, this has been a place of legends and spirits, and its indigenous name, "Shanay Timpishka," means boiled with the heat of the sun. Located 430 miles from the nearest volcano, the Boiling River flows hot for four miles, reaching over 99°C in sections, making it the world's largest documented thermal river. Among the jungle's orchestra of animals roaming free and strong winds whistling, you may catch the sound of the boiling waters bubbling.

It is our first night at the Boiling River, and although we do not know it yet, this experience will be transformative. We are here with 41 other explorers (including National Geographic Explorers) and scientists to study this biodiversity hotspot. We have anthropologists looking for fossils; geologists working to unveil the river's geochemical secrets; biologists searching for new species of the elegant praying mantis ([www.ProjetoMantis.com](http://www.ProjetoMantis.com)); and ecologists studying the implications of elevated temperatures on the local flora. Our team is looking for the Amazonian universe that lives beyond what meets the eye: Amazonian extremophiles – remarkable microscopic organisms that have evolved their genomes over thousands of years to flourish in the river's extreme geothermal features, which are fatal to most organisms.



The sacred Boiling River of the Peruvian Amazon.

PHOTO BY STEPHANIE KING.

These microbes potentially harbor novel extremozymes that enable the biosynthesis of intriguing secondary metabolites that provide them with unique survival advantages; this could mean new molecules with important biological properties useful for reforestation, biotechnology and medicine. What will we find?

Enjoying the limited time of generator-powered electricity we have, we gather to study maps of the area to organize a plan of action. The discussion is led by our fearless leader and geologist, Andrés Ruzo, who introduced the river to the world in 2014 through an engaging TED Talk. After years of working at the Boiling River and advocating for its conservation, he envisioned bringing together experts and students to lead a research initiative of the area; and here we were, the Field Season 11 Expedition team: 41 people, from seven countries,

*continued on page 44*

**Our team is looking for the Amazonian universe that lives beyond what meets the eye: Amazonian extremophiles - remarkable microscopic organisms that have evolved their genomes over thousands of years to flourish in the river's extreme geothermal features, which are fatal to most organisms.**

## Pharmacognosy Field Notes: Seeking Extremophiles in the Boiling River of the Peruvian Amazon



Andrés Ruzo, National Geographic Explorer, TED Speaker, TED Book Author, and Founder and Director of the Boiling River Project, a non-profit organization aimed at understanding, protecting and bringing value to the Boiling River and the Amazon ([www.BoilingRiver.org](http://www.BoilingRiver.org)).

PHOTO BY STEPHANIE KING



Rosa using a field microscope to identify extremophilic cyanobacteria (also known as blue-green algae) in the field.

PHOTO BY ANA E. SOTELO.

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23 different institutions. It was multidisciplinary to the extreme and a heavenly science camp experience.

The sunlight is peaking through the window and roosters are having a loud fest, yet the morning of our first fieldwork day feels calm. I remove the mosquito net around my bed to find countless critters that failed trying to sneak into my bed last night. I try to be quiet as to not disturb my roommates, but the intention goes south. I am in the restroom preparing for a shower when I see a medium-size frog stuck to the shower wall. I stay still; it does not look like a poisonous one. It notices me and athletically jumps to the other side of the room, making me scream, and then mysteriously disappears.

After breakfast we inspect our gear. We will be going for a long hike to scout the river for collection sites, and we cannot forget anything essential. We are carrying field microscopes (to distinguish cyanobacteria from green algae), spatulas, sample dipper ladles (for obtaining samples below the water's surface), knives, collection tubes, sharpies and notebooks. I also pack snacks, water, and first aid kits. Previous trips to the jungle have taught me to always be ready for the unexpected.

We start our hike early in the morning to avoid the midday heat, with everyone's eyes shining with enthusiasm. As we follow trails snaking through dense vegetation, I meditate on life's paths that led us here.

Growing up in Perú, I learned early on to appreciate our *Pachamama* – Mother Earth. My grandmother would tell me

fascinating stories about how nature can cure disease, and I eventually learned that bacteria produce life-saving compounds. Years later, while visiting the Amazon, I thought, *Why don't we ever hear about Amazonian microbes and their chemistry?* I realized pursuing science would allow me to do that, and this goal led me to Dr. David Sherman's laboratory at the University of Michigan (U-M), where I'm completing my PhD in Chemical Biology (co-mentored with Dr. John Montgomery). In 2019, I was named a National Geographic Explorer and grantee to conduct natural products research in the Boiling River as part of my dissertation.

It is clear to me that I would not be walking this path without David, his commitment towards scientific exploration and the trust he places in his mentees. David, an outstanding scientist and adventurer, spearheaded the mission to visit biologically-rich areas around the planet to collect samples for natural product research, creating one of the largest collections of natural product extracts in North America, which has yielded great scientific discoveries. I have learned so much from him at U-M; now I am thrilled to continue learning from him in the field!

After doing an initial reconnaissance, we start sampling at the Boiling River Rapids, one of the hottest spots. The water is flowing rapidly, aggressively. There is enough space for us to be here safely, but we need to be conscious of every step – there's no room for error. As we scrape lichen off the rocks, I

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**My grandmother would tell me fascinating stories about how nature can cure disease, and I eventually learned that bacteria produce life-saving compounds.**

## Pharmacognosy Field Notes: Seeking Extremophiles in the Boiling River of the Peruvian Amazon



**David, an outstanding scientist and adventurer, spearheaded the mission to visit biologically-rich areas around the planet to collect samples for natural product research, creating one of the largest collections of natural product extracts in North America, which has yielded great scientific discoveries.**

David H. Sherman, Hans W. Vahlteich Professor of Medicinal Chemistry at the University of Michigan, collecting sediment samples.

PHOTO BY STEPHANIE KING

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notice the steam reaching us and my hair getting wet from the condensing vapor. The heat is oppressive. It feels like we are in a gigantic, extra-hot sauna, and yet there is nowhere else I would rather be.

It only took one look through my field microscope to confirm that the Amazon Rainforest is more than its fascinating animals and trees. It is home to an “invisible” world that keeps the greater jungle healthy and alive. Through our scientific and outreach work, we hope to share the wonders of this hidden universe with local and international communities before exploitive human activity makes it too late. Currently, we lose half a soccer field of the jungle every minute, and some experts predict that the Amazon will turn into a tropical savannah by 2050. Such predictions are disheartening, but our generation

has the ability to leverage education and science to produce positive change to protect our jungle. This makes our investigations in the Amazon so important: understanding what we have is the first step to finding sustainable solutions that build bridges between nature, people, and an ecofriendly tomorrow.

Before I know it, it is our last night here, and I find myself sitting next to the river again, looking up at innumerable shooting stars streaking across the sky through clouds of vapor from the Boiling River. This image, and our entire experience, seems like it has been taken out of an adventure novel. It is difficult not to fall in love with the Amazon, and I wish upon these stars that more people come visit as they will fall for the jungle, too. We only protect what we truly care about, and we hope to make people care. ■



Left to right: Felipe Huanachín (Ph.D. Candidate at National Agrarian University La Molina Perú), John S. Mead (National Geographic Educator and microscopic videographer, [www.YouTube.com/JSMead](http://www.YouTube.com/JSMead)), David H. Sherman (Research Professor at U-M), Rosa V. Espinoza (NatGeo Explorer), Hannah H. Sherman, Sandhya Narayanan (NatGeo Explorer) and Stephanie King (U-M multimedia designer).

# Conference Calendar



The *Newsletter* is pleased to announce the following upcoming conferences and meetings. The events portrayed here reflect what listings and notices the *Newsletter* has specifically received. For a more extensive calendar, please visit the ASP website at [www.pharmacognosy.us](http://www.pharmacognosy.us). If you have a conference or event you would like mentioned, please send us relevant information, including any graphics or appropriate fliers, at [asp.newsletter@lehman.cuny.edu](mailto:asp.newsletter@lehman.cuny.edu). A number of scientific conferences have been delayed or canceled due to the COVID-19 pandemic, including the ASP-hosted ICNPR 2020 in San Francisco. Please check with conference organizers about the status of any in-person conferences.

## ASP Natural Product Sciences Webinar Bimonthly Zoom Seminars

Thursdays 4 PM EDT / 1 PM PDT

[www.pharmacognosy.us/natural-product-sciences-webinar/](http://www.pharmacognosy.us/natural-product-sciences-webinar/)

## ICNPR 2020: A Global Perspective on Natural Products Research

**CANCELED**

July 25-30, 2020

San Francisco, CA

[www.icnpr2020.org](http://www.icnpr2020.org)

## Virtual Podium 2020

Fridays 3 PM ET / 12 PM PT

[virtualpodium2020.wixsite.com/scienceandchill](http://virtualpodium2020.wixsite.com/scienceandchill)

## 4<sup>th</sup> Annual Institute of Cannabis Research (ICR) Conference

August 11-13, 2020

Pueblo, Colorado

[www.csupueblo.edu/institute-of-cannabis-research/2020-conference/index.html](http://www.csupueblo.edu/institute-of-cannabis-research/2020-conference/index.html)

## ACS Webinars

Every weekday 2 PM ET / 11 AM PT

[www.acs.org/content/acs/en/acs-webinars.html](http://www.acs.org/content/acs/en/acs-webinars.html)

## 6<sup>th</sup> Current Drug Development (CDD) International Conference 2020

September 10-12, 2020

Songkhla, Thailand

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American Society  
of Pharmacognosy



# Brief News from Washington



By Georgia Perdue, PhD

## COVID-19: Encouraging News

- **On May 14** NIH announced in a press release that NIAID has begun clinical trials with the antimalarial drug hydroxychloroquine and the antibiotic azithromycin. The purpose is to establish whether this combination can prevent hospitalization and death from COVID-19. On June 15 FDA revoked the Emergency Use Authorization for chloroquine and hydroxychloroquine to be used to treat certain hospitalized patients with COVID-19.
- **Dr. Anthony Fauci** reported at a White House meeting on April 30 that **results from a clinical trial with 1000 patients given remdesivir, conducted by NIAID, offered “quite good news.” The patients recovered in 11 days. Remdesivir is a drug made by Gilead Sciences Inc.** Dr. Fauci added, “Results were highly significant if you look at the time to recovery.” **FDA is hoping to make the drug available quickly.**
- **NIAID announced on April 17 that the ANTIVIRAL REMDESIVIR PREVENTS DISEASE PROGRESSION IN MONKEYS WITH COVID-19.** FDA Commissioner Dr. Stephen Hahn said the FDA moved **“at lightning speed”** to review the data for its use after great results from the clinical trial. **It granted Emergency Use Authorization** on May 4 for patients with severe COVID-19. He supports clinical testing underway across the US.
- **NIAID has undertaken a new clinical trial to evaluate the efficacy of the antiviral drug remdesivir plus the anti-inflammatory drug baricitinib for COVID-19.** Hospitalized adults with COVID-19 at about 100 sites in the US and internationally will participate. **“We now have solid data showing that remdesivir diminishes to a modest degree the time to recovery for people hospitalized with COVID-19...” said Dr. Fauci.** (See NIAID May 8 press release for more details.)



Dr. Anthony Fauci



Remdesivir

**“We now have solid data showing that remdesivir diminishes to a modest degree the time to recovery for people hospitalized with COVID-19...” said Dr. Fauci.**

- **A Phase 3 clinical trial of a COVID-19 vaccine** is planned to start in the summer by Moderna. [FDA News]
- **NIH issued a press release on April 29: NIH MOBILIZES INNOVATION INITIATIVE FOR COVID-19 DIAGNOSTICS.** The initiative aims to speed delivery of accurate, easy-to-use, scalable tests to all Americans. With a \$1 billion investment from federal stimulus funding, the newly launched Rapid Acceleration of Diagnostics (RADx) **initiative infusion will fund early innovative technologies**

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**to speed development of rapid and widely accessible COVID-19 testing.** NIH will seek opportunities to move more advanced diagnostic technologies swiftly through the development pipeline toward commercialization and broad availability. It will work closely with FDA, CDC, and BARDA to advance these goals. **“We need all innovators from basement to boardroom to come together...Now is the time for that unmatched American ingenuity to bring the best and most innovative technologies forward to make testing for COVID-19 widely available.”**



Dr. Francis Collins

**NIH Director, Dr. Francis Collins, announced NIH was launching a public-private partnership to speed COVID-19 vaccine and treatment options.**

- NIH Director, Dr. Francis Collins, announced **NIH was launching a public-private partnership to speed COVID-19 vaccine and treatment options.** (See press release April 17 for lots of details.)

### COVID-19 AND POLITICS AT SENATE HEARING

On May 12 Dr. Anthony Fauci, CDC Director Dr. Robert Redfield, FDA Commissioner Dr. Stephen Hahn, and Assistant Secretary for Health Admiral Brett Giroir testified by video conference before the Senate Committee on Health, Education, Labor and Pensions, chaired by Senator Lamar Alexander. They used “teleworking” because all had a low risk exposure to the virus. Dr. Fauci said, “There is no guarantee a vaccine is going to be effective.” Senator Alexander emphasized the need to test.

### UNDER INVESTIGATION

- In late April Dr. Michael Lauer, NIH Deputy Director for Extramural Research, notified Eco Health Alliance, Inc. and Columbia University (recipients of a \$3.7 million grant) they are under investigation. Why? Because the money helped fund research for a laboratory in Wuhan, China. [Stay tuned]
- Two Congressional Responses to China: the week of April 19, Congressman Matt Gaetz (R-FI) called for NIH to eliminate the \$3.7 million grant to the Wuhan lab. Senator Tom Cotton (R-Ark) said in a television interview, “The United States should stop giving visas to students from China who come here to learn science.”

- **HACKED:** “Thousands of emails and passwords stolen from NIH, WHO, CDC, and the Gates Foundation.” According to **SITE Intelligence Group**, it appears **“25,000 e-mail addresses and passwords”** of members of the above-mentioned organizations have been posted online. “... almost immediately used to incite harassment and hate by far-right extremists...” **An Australian cybersecurity expert confirmed the hacked WHO data was real.** A more detailed report from SITE re: stolen e-mails and passwords, **largest number from NIH, 9938; CDC, 6857 stolen IDs; World Bank, 5120; and QHO, 2732.**
- **Betty DeVos, Education Secretary**, said in an interview in late April: **As a result of Harvard and Yale failing to report foreign gifts and contracts**, her department is now “educating” colleges and universities how to report such gifts and contracts.

### OUTSTANDING ADVISORS

- Vice President Mike Pence, asked by the President to head up his **White House Coronavirus Task Force**, chose two world-renowned people: **Dr. Deborah Birx and Dr. Anthony S. Fauci, Director of the National Institute of Allergy and Infectious Diseases (NIAID).** Born in 1956 in PA, **Dr. Birx** majored in chemistry at Houghton College in 1976 and received a degree in medicine from the Hershey School of Medicine, Pennsylvania State University. In 1980 she trained in internal medicine at Walter Reed Medical Center followed by more training in basic and clinical immunology at NIH. As a physician in the Army, she rose to the **rank of colonel.** While in the Defense Department as an HIV/AIDS immunology clinician she researched the development of a vaccine. She directed **the U.S. Military HIV Research Program at Walter Reed Army Institute of Research 1996- 2005.** From then until 2014 she headed **the CDC’s Division of Global HIV/AIDS, Center for Global Health.** **In 2014 President Barack Obama chose her as his Global AIDS Coordinator** with the rank of **Ambassador.**



Dr. Deborah Birx

**While in the Defense Department as an HIV/AIDS immunology clinician she researched the development of a vaccine.**

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- **Dr. Anthony Stephen Fauci**, born December 24, 1940, is now not only the Director of NIAID but the “nation’s leading expert on infectious diseases!” His parents owned a pharmacy! And he delivered prescriptions! He attended the College of Holy Cross in NY and received his medical degree from Cornell University Medical College. He completed both his internship and residency at the New York Hospital- Cornell Medical Center. He joined the NIH in 1968 and held a couple positions. In 1984 he became director of NIAID. He married a nurse he met at NIH, Christine Grady. Interesting compliments: Atlanta-based Wild Heaven Beer now has a new spring brew, “Fauci Spring,” and a new lager, “Don’t Stand So Close to Me.” Finally, when in high school and known as “Fauch,” he became captain of his flailing basketball team and stayed very close to his players while his team went on to win games!



Dr. Anthony Fauci



Fauci Spring, new brew

Atlanta-based Wild Heaven Beer now has a new spring brew, “Fauci Spring,” and a new lager, “Don’t Stand So Close to Me.” (Fauci)...became captain of his flailing basketball team and stayed very close to his players while his team went on to win games!

## HISTORIC DISCOVERIES

- In 1964, while looking into her electron microscope as a lab technician, **June Hart, a young Scottish woman, saw a round, grey dot covered in tiny spokes which formed a halo, like the sun’s corona, around the virus. She had discovered the coronavirus!** She left Scotland and continued her lab work at London’s St. Bartholomew’s Hospital. After her marriage, June Hart Almeida and her husband moved to Toronto, Canada where she continued her work on viruses and published several papers (see *National Geographic*).



June Hart

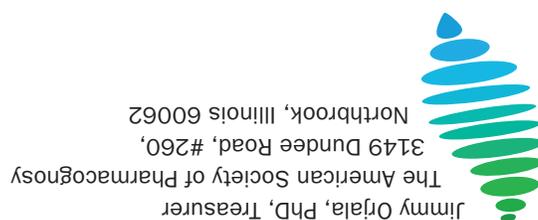
June Hart ...saw a round, grey dot covered in tiny spokes which formed a halo, like the sun’s corona, around the virus. She had discovered the coronavirus!

- The discovery of the malaria drug chloroquine from *Colchicum autumnale* is interesting. **Johann Andersag, also known as Hans Andersag, born in 1902 in Italy, made the discovery while working for Bayer AG.** He died on August 10, 1955. So it is fitting that **Sandoz** donated more than 30 million doses of hydroxychloroquine sulfate, and **Bayer** donated more than one million doses of chloroquine phosphate to treat hospitalized COVID-19 patients.

## MEDICINAL MUSHROOMS



- For some hundreds of years Asian countries have used “medicinal” mushrooms to treat infections. In recent years their use has been for pulmonary disease and cancer. At least one hundred species of such mushrooms are found in the Asian culture. Four such species include *Ganoderma lucidum* (reishi), *Coriolus versicolor* (turkey tail), *Lentinus edodes* (shiitake) and *Grifola frondosa* (maitake). [Worth reading is the long article with references at **NCI PDQ (Physician Data Query)**]. ■



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